United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Mount Lewis Field Office
50 Bastian Road
Battle Mountain, Nevada 89820
http://www.blm.gov/

APR 2 6 2010

In Reply Refer to:
N-86292
DOI-BLM-NV-063-EA08-091
3200 (NVB0100)

Dear Interested Parties,

The Bureau of Land Management (BLM), Battle Mountain District Office (BMDO), Mount Lewis Field Office (MLFO) is seeking public comment on the proposed Ormat Nevada Incorporated (Ormat), Geothermal Projects in Lander County and Pershing County, Nevada.

Ormat has submitted a plan to construct two geothermal power plants in Lander and Pershing Counties. As part of this proposal, Ormat Inc. has also applied for two rights of ways (ROW) to construct a 120 KV Transmission line and an associated access road. The MLFO has prepared an Environmental Assessment (EA) that will analyze all four proposed actions. The geothermal power generation facilities would have a net generating capacity of up to 60 megawatts (MW) of electricity. The proposed plants and the associated Right-of-Way's will be comprised of approximately 125 acres of permanent surface disturbance of BLM-managed public lands.

The proposed project would be designed for a life span of 50 years. Construction of the generating facility, associated transmission line and roads, from site preparation and grading to commercial operation, would be expected to take approximately 12 months.

Interested parties are encouraged to be a part of this planning process. The EA has been enclosed for your review and you can be involved by submitting written comments to the Bureau of Land Management, Battle Mountain District, Attn: Tim Coward, Renewable Energy Coordination Office Program Manager, 50 Bastian Road, Battle Mountain, Nev. 98920; by fax (775) 635-4034 (attention: Tim Coward); or e-mail to: timothy_coward@blm.gov.

The Plan of Development, Operations Plan and Utilization Plan may be viewed electronically at Ormat's web site: www.Ormat.com.

Before including your address, phone number, e-mail address, or other personal identifying information in your comment, you should be aware that your entire comment, including your personal identifying information, may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

Federal, State, and local agencies, as well as individuals or organizations that may be interested in or affected by the BLM's decision on this project, are invited to participate in the planning process.

Comments must be received by close of business, May 10th, 2010.

Any questions regarding this proposed project may be directed to Tim Coward, Renewable Energy Program Manager at (775) 482-7800.

Sincerely,

Douglas W. Furtado
Field Manager
Mount Lewis Field Office

Enclosure: DOI-BLM-NV-063-EA08-091

U.S. Department of the Interior

Bureau of Land Management
Environmental Assessment DOI-BLM-NV-063-EA08-091
DATE: April 2010

Jersey Valley and Buffalo Valley

Geothermal Development Projects
Pershing and Lander Counties, Nevada

ENVIRONMENTAL ASSESSMENT

Battle Mountain District Office

Bureau of Land Management

50 Bastian Road

Battle Mountain, Nevada 89820-1240

Phone: 775-635-4000

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Ormat Nevada, Inc.
Jersey Valley and Buffalo Valley Geothermal Development Project
Environmental Assessment

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1 INTRODUCTION

1.1 BACKGROUND

Ormat Nevada, Inc. (Ormat) has conducted geothermal exploration activities within the Jersey Valley and Buffalo Valley areas of Pershing and Lander Counties, Nevada (see Figure 1). A summary of these activities and project approvals is provided below.

In May 2007, the Bureau of Land Management (BLM), Humboldt River Field Office (HRFO), (formerly known as the Winnemuca Field Office), approved an Environmental Assessment (EA) for Ormat's Jersey Valley Geothermal Exploration Project. The project included the drilling and testing of observation and full-sized wells and building access roads, as appropriate. The five currently approved wells under this EA (NV063-EA06-100) are: 18-27, 81-28, 44-28, 86-29 and 33-33 (well 86-29 was subsequently relocated to well site 14-27) (see Figure 2). Total surface disturbance associated with the Jersey Valley Exploration Project was less than 10 acres.

In June 2007, Ormat created the Jersey Valley Federal Geothermal Unit (NVN-83483X), which is comprised of federal geothermal leases NVN-74881, NVN-74883, NVN-77481, NVN-77482 and NVN-77483, and is in Pershing and Lander Counties, Nevada (see Figure 2).

In November 2008, the BLM, HRFO approved an EA for the Jersey Valley II Geothermal Exploration Project, also for the drilling and testing of observation and full-sized wells and access road construction, as appropriate. The two currently approved wells under this EA (LLNV-WO1000-2009-002-EA) are 77-28 and 13-34 (see Figure 2). Total surface disturbance associated with the Jersey Valley II Exploration Project was less than 10 acres.

Additionally, in September 2006 the BLM, Mount Lewis Field Office (MLFO) (formerly known as the Battle Mountain Field Office), approved an EA for Ormat's Buffalo Valley Geothermal Exploration Project. The project included the drilling and testing of temperature gradient holes, observation wells and full-size wells and associated access road construction, as appropriate. The eleven currently approved wells under this EA (NV063-EA06-100) are: 75-24, 66-35, 17-25, 84-27, 23-27, 75-25, 84-24, 31-26, 27-22, 32-25 and 52-34 (see Figure 3). Total surface disturbance associated with the Buffalo Valley Exploration Project was less than 7 acres.

In June 2007, Ormat created the Buffalo Valley Federal Geothermal Unit (NVN-83484X), which is comprised of federal geothermal leases NVN-74865, NVN-74868 and NVN-74869, and is in Lander County, Nevada (see Figure 3).

In July 2008, the BLM MLFO approved additional exploration activities within the Buffalo Valley Geothermal Unit under a Determination of NEPA Adequacy (DNA). The seven

observation and full-sized wells approved under the DNA (NV062-DNA08-151) are: 54-27, 51-23, 81-23, 21-24, 72-23, 53-23 and 13-24 (see Figure 3). Total surface disturbance associated with the Buffalo Valley II Exploration Project was less than 42 acres.

Based on the successful results of the exploration activities within the Jersey Valley and Buffalo Valley Units, Ormat has determined that the geothermal resources are capable of commercial production. As such, Ormat is proposing the Jersey Valley Geothermal Development Project and the Buffalo Valley Geothermal Development Project.

1.2 LOCATION AND SUMMARY OF PROPOSED ACTION

Ormat is proposing to construct, operate and maintain the Jersey Valley Geothermal Development Project (Jersey Valley Project) and the Buffalo Valley Geothermal Development Project (Buffalo Valley Project). Each Project includes the construction and operation of a power generating facility, geothermal wellfields, geothermal production and injection pipelines, access roads and ancillary support facilities. Additionally, an approximately 27.59-mile overhead 120 kV transmission line (NVN-87409) would be constructed, originating at the proposed Jersey Valley power plant, trending north-northeast through the Buffalo Valley power plant, and terminating at the proposed Sierra Pacific Power Company (SPPCo.) Bannock substation (see Figure 4).

The Jersey Valley Project is located within the Jersey Valley geothermal unit, and encompasses approximately 8,470 acres of public and private lands in Sections 15-16, 20-22, 27-29 and 32-34, Township 27 North, Range 40 east (T.27N. R.40E.), Mount Diablo Baseline and Meridian (MDB&M), and the entirety of Section 3 and portions of Sections 4 and 5, T.26N. R.40E., MDB&M (see Figure 2).

The Buffalo Valley Project is located within the Buffalo Valley geothermal unit, and encompasses approximately 5,120 acres of public lands in Sections 13-14, 22-27 and 34-35, T.29N. R.41E., MDB&M (see Figure 3).

The Proposed Action also includes the construction and operation of an approximately 27.59-mile overhead electrical transmission line originating at the proposed Jersey Valley power plant and terminating at the proposed SPPCo. substation (see Figure 4). The Buffalo Valley power plant would "tie-in" to the proposed transmission line (see Figure 4). Table 1 shows what has been submitted to the BLM on behalf of each Project.

Table 1: Project Submittals

	Operations Plan[1]		Utilization Plan[2]		ROW/PoD[3]	
	Original	**Revised**	**Original**	**Revised**	**Original**	**Revised**
Jersey Valley	April 2009	March 2010	April 2009	April 2010	n/a	n/a
Buffalo Valley	April 2009	March 2010	April 2009	April 2010	n/a	n/a
Transmission Line	n/a	n/a	n/a	n/a	April 2009	April 2010

	Operations Plan[1]		Utilization Plan[2]		ROW/PoD[3]	
	Original	**Revised**	**Original**	**Revised**	**Original**	**Revised**
New Road	n/a	n/a	n/a	n/a	March 2010	April 2010

1 For approval to drill and test those geothermal wells located on public lands managed by the BLM which would be used for production and injection of geothermal fluid for the Project.
2 For approval of the utilization facilities (i.e. power plant, pipelines, etc.) located on public lands managed by the BLM.
3 For those portions of the transmission line corridor and the new road located on public lands managed by the BLM .

1.3 PURPOSE AND NEED

Background

Ormat's purpose of the Project(s) is to commercially develop the geothermal resources within the federal geothermal unit(s); to construct and operate commercial geothermal power plant(s) and wellfield(s) within the unit(s); and to transport generated electricity from the Project(s) to a power purchaser in compliance with the Nevada State mandated Renewable Portfolio Standard. The purpose of the Project's transmission line and electrical substation is to provide the electrical interconnection with the existing SPPCo./Nevada Energy (NVE) electrical transmission system at the proposed junction in an economically viable manner which minimizes transmission line energy losses and adverse environmental impacts. Ormat needs to be able to produce geothermal resources in commercial quantities from the Unit(s) or the federal geothermal leases will terminate.

Agency's Purpose and Need

Under the Federal Land Policy and Management Act of 1976 and its implementing regulations, including 43 CFR 2800, BLM must respond to Ormat's ROW applications. Under the terms of the Geothermal Steam Act, its revisions of 2007, and it's implementing regulations; and the Programmatic Geothermal Environmental Impact Statement and its Record of Decision of December, 2008. BLM must respond to the proposed plans, applications and programs submitted by the lessee or the lessee's designated operator. The BLM is also required to comply with NEPA and the Council on Environmental Quality (CEQ) regulations.

The Agency's need for the Proposed Action is to respond to the submitted Operations Plans, Utilization Plans and FLPMA ROW applications submitted by the proponent to construct and operate the Jersey Valley and Buffalo Valley Geothermal Development Projects.

The BLM has determined that an EA would be needed to evaluate and disclose the potential environmental impacts associated with this proposed action and any reasonable alternatives to the proposed action which would include a no action alternative. This EA will serve as a decision-making tool to assist BLM Battle Mountain District Office (BMDO) in its determination to approve the proposed action, require modification or deny the proposed action. At the conclusion of the EA process, the BLM must determine if the proposed action and/or any modifications of the proposed action would cause significant environmental impacts to the

human environment. If no such impact would occur, then a Finding of No Significant Impact (FONSI) would be prepared, and the BLM would approve the submitted Operations Plan(s), Utilization Plan(s) and Right-of-Way applications. If, at any time during the analysis, a determination of significant impacts is made that could not be appropriately mitigated at the EA level, an Environmental Impact Statement (EIS) would be required.

1.4 LAND USE PLAN CONFORMANCE

The Jersey Valley Unit Area and the southern half of the proposed transmission line are administered by the BLM through the HRFO. The area is subject to the BLM WFO Sonoma-Gerlach Management Framework Plan (MFP), dated July 9, 1982. Objective M-5 of the MFP states "Make energy resources available on all public lands and other lands containing federally owned minerals." The MFP provides for the development of geothermal resources in noncompetitive areas and all Known Geothermal Resource Areas (KGRAs) except those which are areas of significant environmental conflict or have historical and/or cultural significance.

The Buffalo Valley Unit Area and the northern half of the proposed transmission line are administered by the BLM through the MLFO. The Unit Area is subject to the BLM Shoshone-Eureka Resource Management Plan (RMP), which was approved in 1986.

Part II, Section E, "Management Actions Not Expressly Addressed by the Resource Management Plan," of the RMP includes the section "Minerals Objectives and Management Decisions," brought forward unaltered from the earlier BLM "Management Framework Plan" (Record of Decision, page 29). Minerals Objectives 1, 2 and 3 lead to Management Decision #2 (Leaseable Minerals - Geothermal Steam). The three objectives are:

- Objective 1: Make available and encourage development of mineral resources to meet national, regional and local needs consistent with national objectives for an adequate supply of minerals.
- Objective 2: Assure that mineral exploration, development and extraction are carried out in such a way as to minimize environmental and other resource damage and to provide, where legally possible, for the rehabilitation of lands.
- Objective 3: Develop detailed mineral resource data in areas where different resources conflict so that informed decisions may be made that result in optimum use of the lands.

Management Decision #2 (Leaseable Minerals – Geothermal Steam), states that: "All areas designated by the BLM as prospectively valuable for geothermal steam will be open for exploration and development unless withdrawn or restricted from mineral entry. All public lands disposed of in these areas will have the geothermal resources reserved to the federal government." (BLM 1987).

The Proposed Action is in conformance with the Sonoma-Gerlach MFP and Shoshone-Eureka RMP.

1.5 RELATIONSHIP TO LAWS, REGULATIONS AND OTHER PLANS

The EA has been prepared in accordance with the following statutes and implementing regulations, Policies and Procedures:

- The National Environmental Policy Act of 1969, as amended (Public Law [PL] 91-190, 42 U.S.C. 4321 (*et seq.*);
    - 40 CFR 1500 (*et seq.*). Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act.
    - Considering Cumulative Effects under the National Environmental Policy Act [CEQ 1997];
    - USDI requirements (Departmental Manual 516, Environmental Quality [USDI 2007]);
    - BLM NEPA Handbook (H-1790 1) (BLM 1988 and BLM 2008a);
- The Federal Land Policy and Management Act of 1976 (PL 94 579, 43 U.S.C. 1761 (*et seq.*);
    - 43 CFR 2800, Rights-of-Way, Principles and Procedures; Rights-of-Ways under the Federal Land Policy and Management Act and the Mineral Leasing Act; Final Rule, April 22, 2005.
- The Geothermal Steam Act of 1970 (Act) (30 USC 1001-1025).
    - 43 CFR 3200, Geothermal Resources Leasing and Operations; Final Rule, May 2, 2007.
- The 2005 Energy Policy Act; The National Energy Policy, Executive Order 13212;
- Best Management Practices as defined in the Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development (Gold Book); and

Other environmental analysis documents which were used in production of this EA:

- Programmatic Environmental Assessment Geothermal Leasing and Exploration Shoshone-Eureka Planning Area (BLM BMFO 2002);
- Geothermal Resources Programmatic Leasing Environmental Assessment (BLM WFO 2002);
- Jersey Valley Geothermal Exploration Project Environmental Assessment (BLM 2007);
- Jersey Valley II Geothermal Exploration Project Environmental Assessment (BLM 2008d), and
- Buffalo Valley Geothermal Exploration Project Environmental Assessment (BLM 2006)

1.6 IDENTIFIED ISSUES

The scope of this EA is based upon specific issues and concerns identified by BLM, other federal agencies, state agencies and local agencies. These issues and concerns include:

- Avoidance of cultural resource sites;
- Riparian vegetation associated with the Hot Springs;

- Special Status Species;
- The quality and quantity of waters on public lands; and
- Invasive, nonnative species

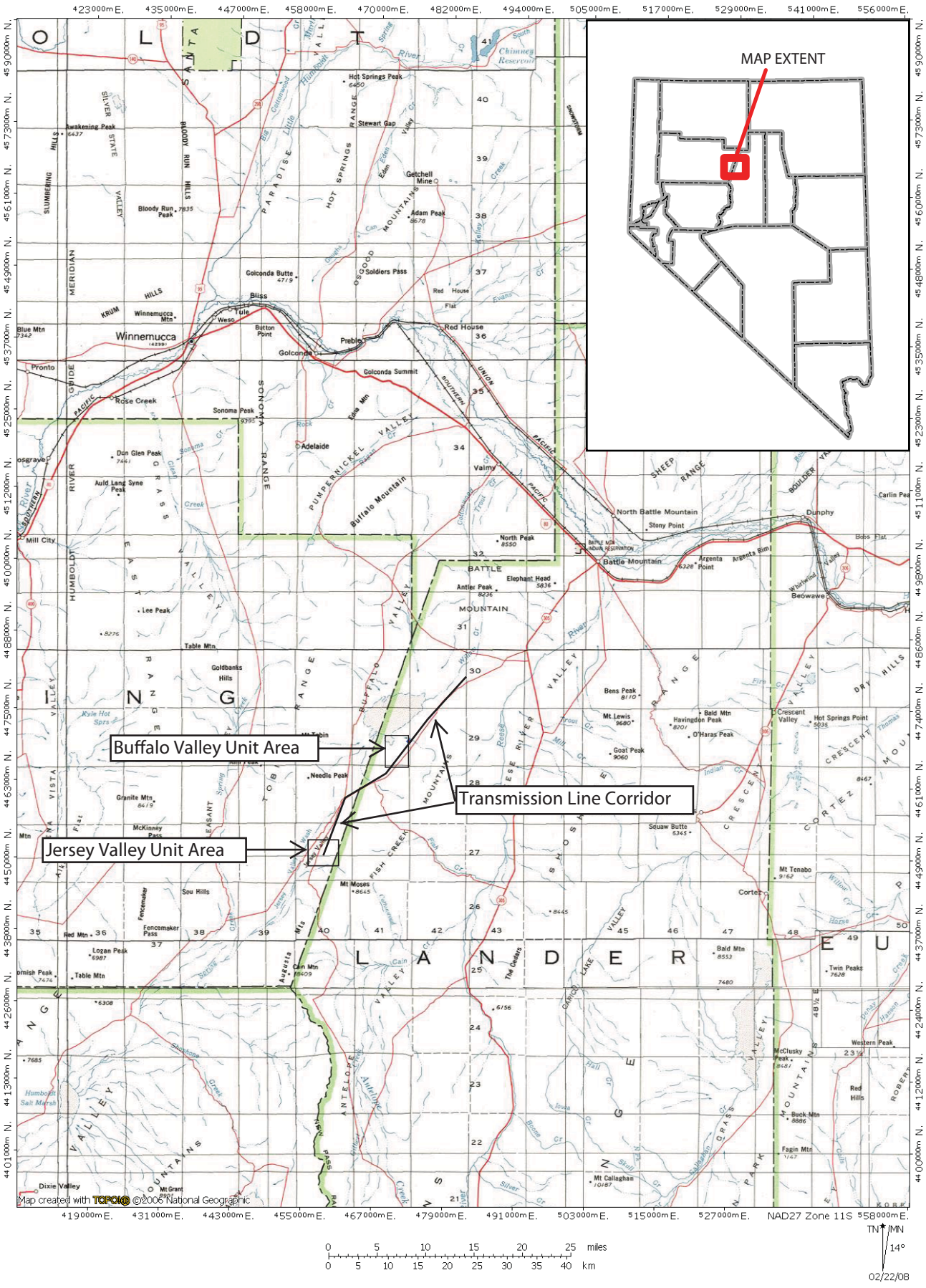
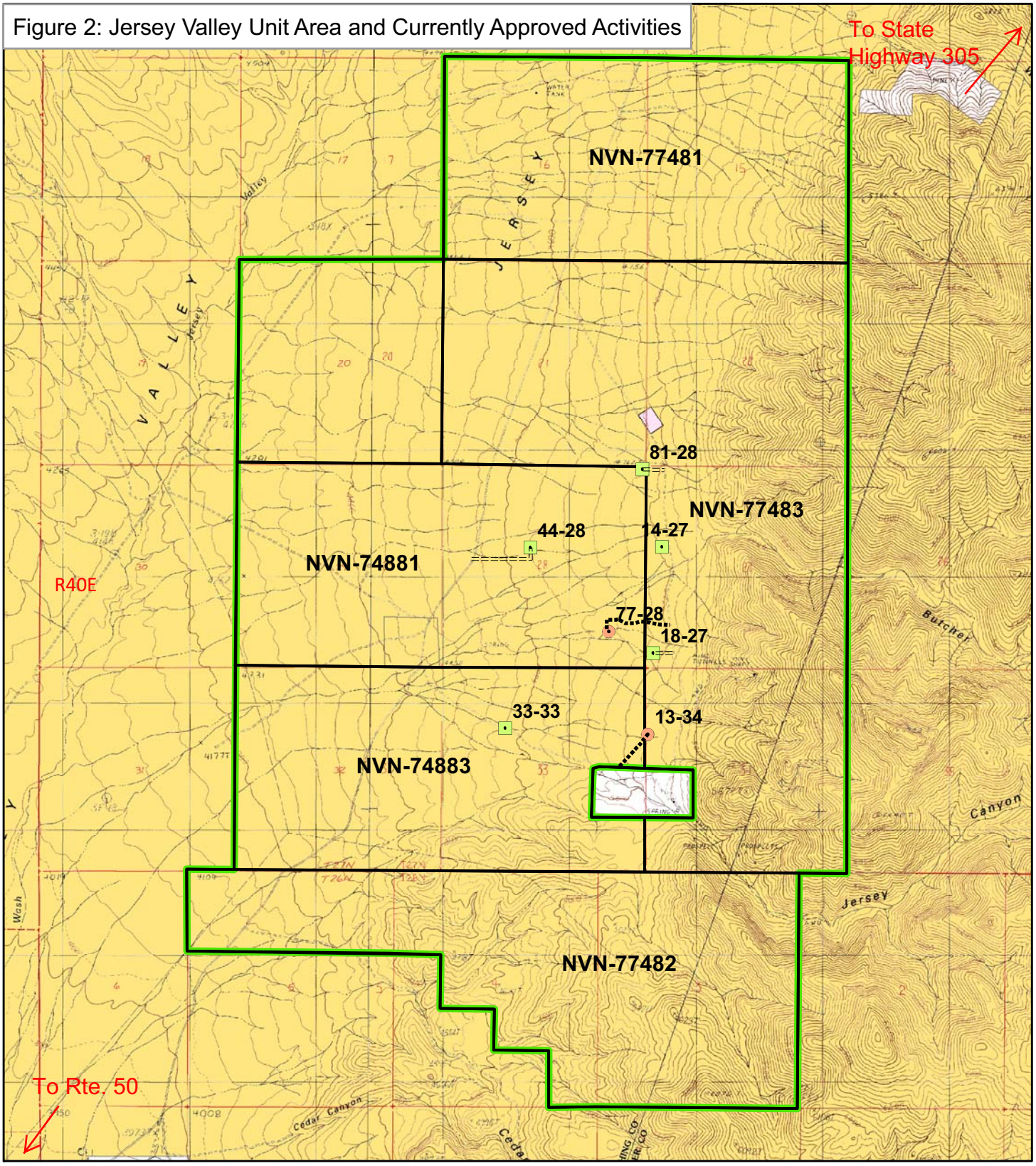


Figure 1: Project Vicinity Map

Figure 2: Jersey Valley Unit Area and Currently Approved Activities



LEGEND

- Currently Approved Well Site (2007)
- Currently Approved Well Site (2008)
- Currently Approved Access (2007)
- Currently Approved Access (2008)
- Currently Approved Gravel Source
- Geothermal Lease Boundary
- Jersey Valley Geothermal Unit Area (NVN-83483X)
- Bureau of Land Management Land
- Private Land

0 0.5 1 2 Miles

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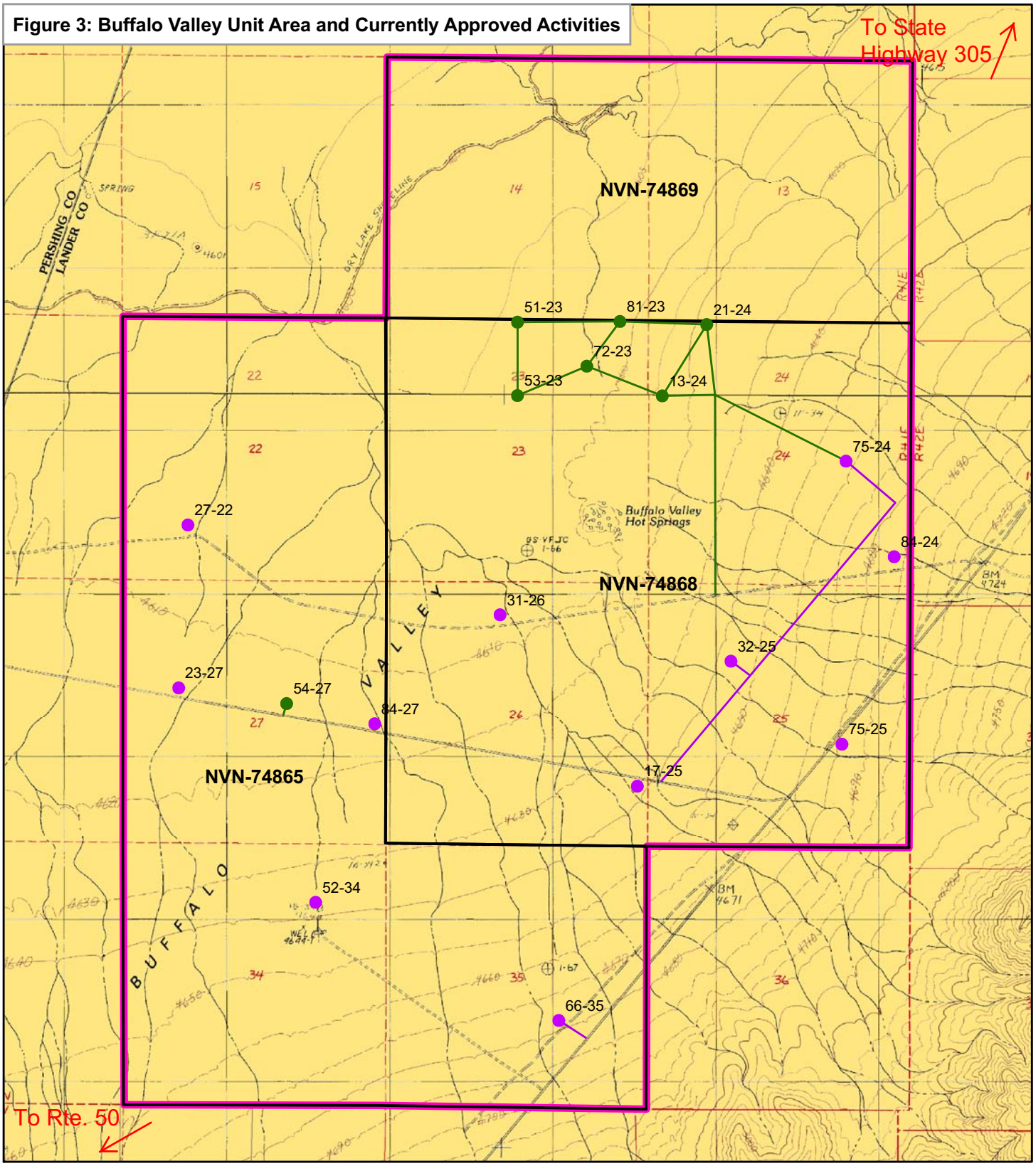
The data shown on the map uses the Universal Transmercator (Zone 11N) Coordinate system and uses the NAD83 projection.

Map Date: November 3, 2009

N W E S

Figure 3: Buffalo Valley Unit Area and Currently Approved Activities



LEGEND

- Previously Approved Well Site (2006)
- Previously Approved Well Site (2008)
- Previously Approved Access Road (2006)
- Previously Approved Access Road (2008)
- Geothermal Lease Boundary
- Buffalo Valley Geothermal Unit Area (NVN-838484X)
- Bureau of Land Management Land

0 0.25 0.5 1 Miles

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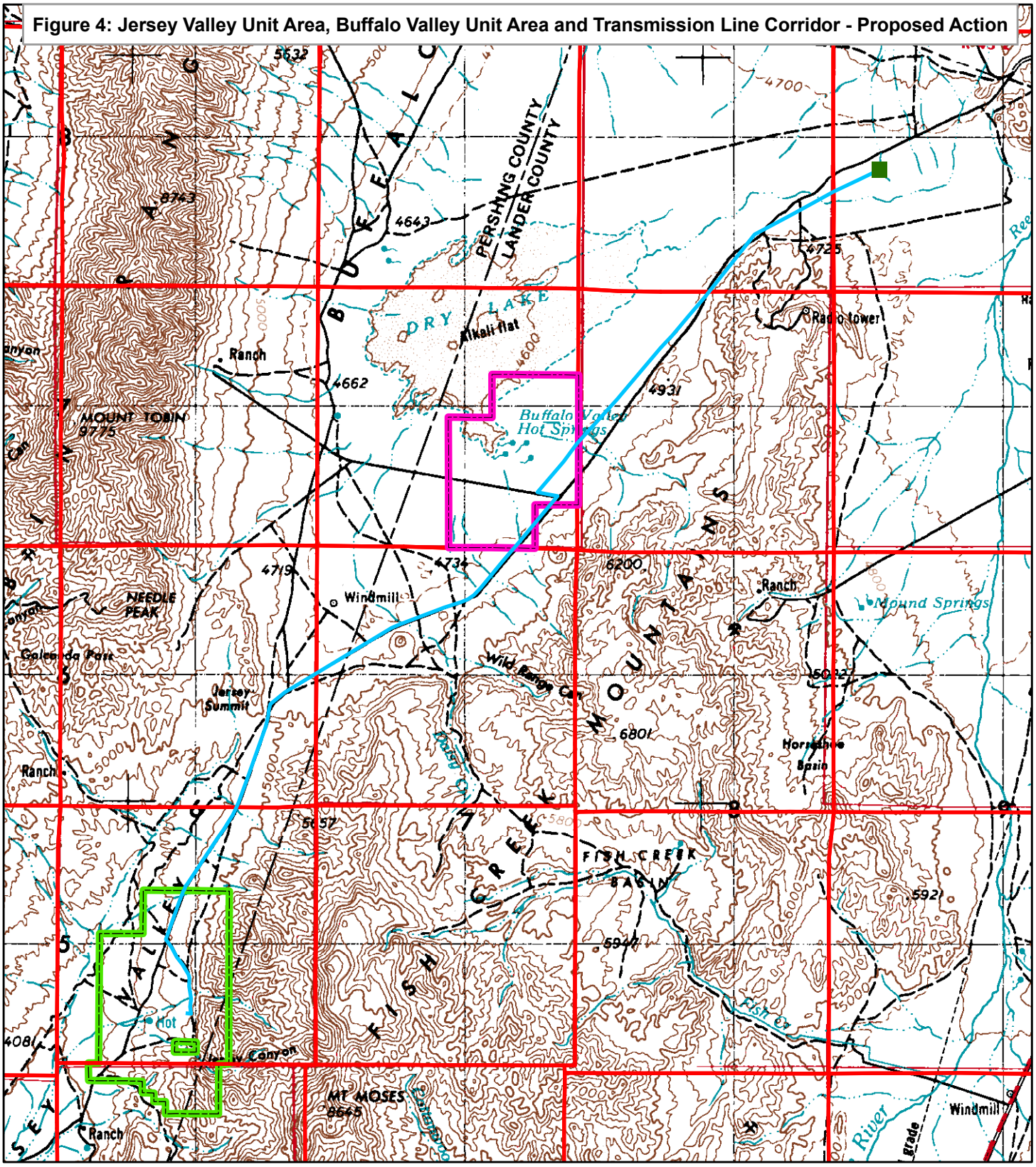
Figure 4: Jersey Valley Unit Area, Buffalo Valley Unit Area and Transmission Line Corridor - Proposed Action



LEGEND

- Bannock Substation - Proposed
- 120 kV Power ROW - Proposed
- Buffalo Valley Geothermal Unit Area (NVN-838484X)
- Jersey Valley Geothermal Unit Area (NVN-83483X)

0 1.5 3 6 Miles

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Map Date: November 3, 2009

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2 PROPOSED ACTION AND ALTERNATIVES

2.1 PROPOSED ACTION

2.1.1 The Power Plants

The Jersey Valley power plant will be an approximately 30 Megawatts (MW) geothermal power plant. The proposed power plant would be located in the SE1/4, SE1/4 Section 28 T.27N., R.40E. A switching station, used to transform generated low voltage to the higher voltage required for a transmission line, would be constructed within the power plant boundaries as shown in Figure 5.

A microwave communication tower would be about eight (8) feet tall; a radome antenna on a monopole; and attached to the power plant building. The tower will transmit to the Fencemaker microwave building/tower. It would also be built within the Jersey Valley power plant area and would consist of a microwave antenna, aimed west toward the existing communication link on the Tobin Range (NVN-57070). This system would be used to deliver signals from control centers and other remote locations, report operating status, and provide voice communication from dispatchers to power plant operators and maintenance personnel. This system would be considered an exclusive use communications system for Ormat.

The Buffalo Valley power plant will also be an approximately 30 MW geothermal power plant. The proposed power plant would be located in the SW1/4, SE1/4 Section 24 T.29N., R.41E. The Buffalo Valley switching station would be constructed within the power plant boundaries as shown in Figure 6.

Permanent and temporary surface disturbance for each power plant can be found in Table 5.

2.1.1.1 Operation and Maintenance Procedures

The Ormat power plants will utilize a binary design with an air-cooled heat rejection system.

The geothermal fluids for the binary power plant will be produced from the production wells by pumping. Once delivered to the power plant, the heat in the geothermal fluid will be transferred to the "binary" (or secondary) fluid in multiple stage non-contact heat exchangers. The binary turbine units will use pentane (C_5H_{12}), a flammable but non-toxic hydrocarbon, as the binary fluid, which circulates in a closed loop. The heat from the geothermal fluid vaporizes the binary fluid, which turns the binary turbine and electrical generator to make electricity.

The vaporized binary fluid exits the turbine and is condensed back into a liquid in a shell-and-tube, non-contact, air-cooled condenser. The condensed binary fluid is then pumped back to the heat exchangers for re-heating and vaporization, completing the closed cycle.

The residual geothermal fluid from the heat exchangers is pumped under pressure out to the geothermal injection wells through the injection pipelines and injected back into the geothermal reservoir. The geothermal fluid will flow through the binary power plant in a closed system, with no emissions of non-condensable gases to the atmosphere.

The air-cooled condenser will range between 28 and 35 feet in height and are about two-thirds the length of the binary power plant site. In addition to the geothermal fluid handling system, turbine-generators and turbine building, control and support buildings, the substation and electrical systems, and the binary fluid storage tank(s); the power plant site will include a water storage tank and pumps for non-potable uses and fire protection.

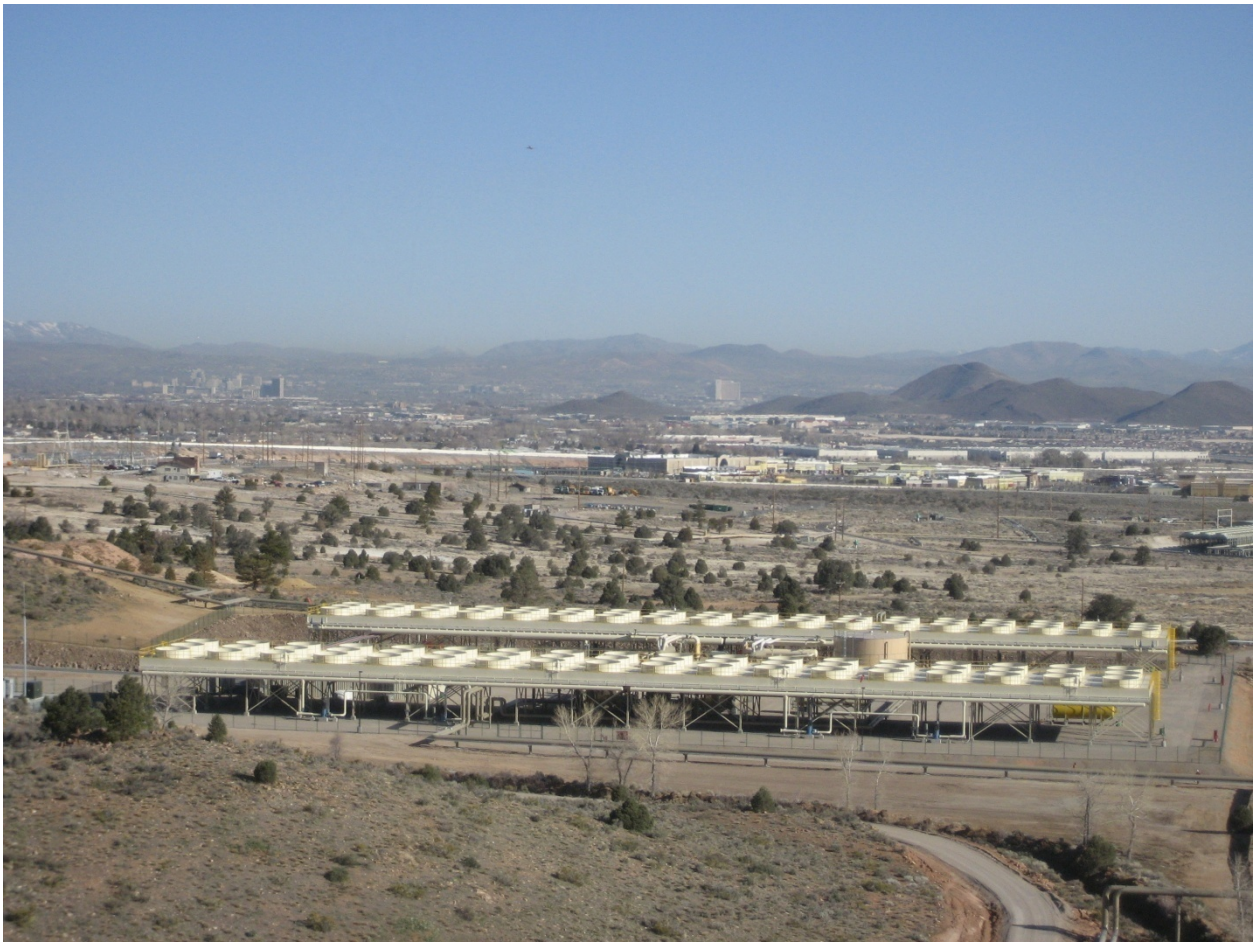


Photo 1: Air Cooled Geothermal Power Plant

2.1.1.2 Construction Procedures and Surface Disturbance

Power plant site preparation activities would begin with clearing, earthwork, drainage and other improvements necessary for commencement of construction. Clearing would include removal of organic material, stumps, brush and slash.

A portion of the power plant site and adjacent well pads would be devoted to equipment and materials laydown, storage, construction equipment parking, small fabrication areas, office trailers and parking. Equipment and materials laydown space is required for large turbine parts, structural steel, piping spools, electrical components, switchyard apparatus, and building parts. Mobile trailers or similar suitable facilities (e.g., modular offices) would be brought to the site to be used as construction offices for owner, contractor, and subcontractor personnel. Travel trailers would be used for construction management to reside on the site and would provide for 24 hour management and emergency response. Parking would be provided for construction workers and visitors within the power plant area.

Temporary utilities will be provided for the construction offices, the laydown area, and the power plant site. Temporary construction power will be supplied by a temporary generator and, if available when the transmission line is completed, at the site by utility-furnished power. Area lighting will be provided for safety and security. Drinking water will be imported and distributed daily. Portable toilets will be provided throughout the site, office and travel trailers and would connect to temporary septic holding systems.

Consistent with safety requirements, power plant buildings, structures, security fencing, pipe, etc. would each be painted an appropriate color (likely covert green) to blend with the area and minimize visibility.

2.1.2 Wells, Wellfields, Well Maintenance and Other Ancillary Facilities

The Proposed Action includes the construction and operation of geothermal fluid production and injection wells, access roads, geothermal fluid pipelines and power generation facilities within both the Jersey Valley Geothermal Unit (Jersey Valley Unit Area) and the Buffalo Valley Geothermal Unit (Buffalo Valley Unit Area).

Production wells flow geothermal fluid to the surface. Injection wells are used to inject geothermal fluid from the power plant into the geothermal reservoir. Injection ensures the longevity and renewability of the geothermal reservoir. The number of geothermal production and injection wells required for the Project(s) is principally dependent on the productivity (or injectivity) of the wells and the temperature and pressure of the produced geothermal fluid.

Within the Jersey Valley Unit Area, Ormat expects that 17 geothermal production wells and 7 geothermal injection wells are needed (see Figure 5). Within the Buffalo Valley Unit Area, Ormat expects that 10 geothermal production wells and 5 geothermal injection wells are needed (see Figure 6).

Each well is or would be located on a well pad in the shape of a rectangle and approximately 4.2 acres in size.

Reserve pits would be constructed in accordance with best management practices identified in the “Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development (The Gold Book)” (Fourth Edition – 2007) on each pad for the containment and temporary

storage of water, drill cuttings and waste drilling mud during drilling operations. Geothermal fluid produced from the well during flow testing will also drain to the reserve pit. The reserve pit waste will be sampled for hazardous contaminants. Typical tests may include the Toxicity Characteristic Leaching Procedure (TCLP) (EPA Method 1311), tested for heavy metals; pH (EPA method 9045D); Total Petroleum Hydrocarbons/Diesel (EPA Method 8015B); and Oil and Grease (EPA Method 413.1).

The reserve pits would be fenced with an exclosure fence on three sides and then fenced on the fourth side once drilling has been completed to prevent access by persons, wildlife or livestock. The fence would remain in place until pit reclamation begins. For the drilling of each well, the reserve pit would measure approximately 75 feet by 200 feet by 10 feet deep. Figure 13 shows the recommended construction standards for exclosure fences in livestock areas (Gold Book, Fourth Edition – 2007).

Permanent and temporary surface disturbance associated with the geothermal wellfields can be found in Table 5.

2.1.2.1 Well Drilling and Testing

Specific drilling information is provided in Table 2.

Table 2: Well Drilling Specifics

Rig Type	Rig Height (ft.)	Trucks Needed (on average)	Drilling Time (days) [1]	Workers On Site	Depth Drilled (ft.)
Large rotary drilling rig	160-170	25+ tractor/trailer 8 small trucks	45[2]	Avg. = 9-10 Max = 18	7,000

[1] Difficulties encountered during the drilling process, including the need to re-drill the well, could as much as double the time required to successfully complete each well.
[2] Drilling would be conducted 24 hours a day, 7 days a week.

The drilling supervisor and mud logger would typically sleep in a trailer on the active drill site while the well is being drilled. The drilling crew may also live “on site” during the drilling operations in a self-contained “bunkhouse” (sleeping quarters, galley, water tank and septic tank) or portable trailers which would be placed on one of the drill sites not being actively drilled to accommodate the drill rig workers.

“Blow-out” prevention equipment would be utilized while drilling below the surface casing. During drilling operations, a minimum of 10,000 gallons of cool water and 12,000 pounds of inert, non-toxic, non-hazardous barite (barium sulfate) would likely be stored at each well site for use in preventing uncontrolled well flow (“killing the well”), as necessary.

The well bore would be drilled using non-toxic, temperature-stable drilling mud composed of a bentonite clay-water or polymer-water mix for all wells. Variable concentrations of additives would be added to the drilling mud as needed to prevent corrosion, increase mud weight, and prevent mud loss. Some of the mud additives may be hazardous substances (see Section 3.11), but they would only be used in low concentrations that would not render the drilling mud toxic.

Additional drilling mud would be mixed and added to the mud system as needed to maintain the required quantities.

Each well may need to be worked over or redrilled. Depending on the circumstances encountered, working over a well may consist of lifting the fluid in the well column with air or gas or stimulation of the formation using dilute acid or rock fracturing techniques.

Well redrilling may consist of: 1) reentering and redrilling the existing well bore; 2) reentering the existing well bore and drilling and casing a new well bore; or 3) sliding the rig over a few feet on the same well pad and drilling a new well bore through a new conductor casing. While the drill rig is still over the well, the residual drilling mud and cuttings would be flowed from the well bore and discharged to the reserve pit.

Short-Term Well Testing

Each test, lasting approximately 3 to 5 days on average, would consist of flowing the well into the reserve pit or portable steel tanks brought onto the well site while monitoring geothermal fluid temperatures, pressures, flow rates, chemistry and other parameters. An "injectivity" test may also be conducted by injecting the produced geothermal fluid from the reserve pit or steel tanks back into the well and the geothermal reservoir. The drill rig would likely be moved from the well site following completion of these short-term test(s). Each short-term well test is expected to flow approximately 1.5 million gallons.

Long-Term Well Testing

One or more long-term flow test(s) of each well drilled would likely be conducted following the short-term flow test(s) to more accurately determine long-term well and geothermal reservoir productivity. The long-term flow test(s), each lasting between 7-30 days, would be conducted by pumping the geothermal fluids from the well through onsite test equipment closed to the atmosphere (using a line shaft turbine pump or electric submersible pump) to the reserve pit. Each long-term well test is expected to flow approximately 15 million gallons.

A surface booster pump would then pump the residual produced geothermal water/fluid from the reserve pit through a temporary 8" to 10" diameter pipeline to either inject the fluid into one of the other geothermal wells drilled within the Project area or to the reserve pit on another well pad. The temporary pipeline would either be laid "cross-country" or on the surface of the disturbed shoulders on the access roads connecting the geothermal full-size wells (as required, roads would be crossed by trenching and burying the temporary pipe in the trench). The onsite test equipment would include standard flow metering, recording, and sampling apparatus.

2.1.2.2 Well Operations

Once the well is drilled and well head completed, an industrial grate is placed over the hole to prevent humans and wildlife from falling into the cellar.

Each of the production wells would be equipped with a pump to bring the geothermal fluid to the surface under pressure. The electricity to power the well pump motors would be supplied via an electric conductor installed from the power plant along the connecting pipelines.

Wellhead dimensions for the production wells are not expected to exceed a height of fifteen feet above the ground surface or four feet in diameter. Wellhead dimensions for the injection wells would be much smaller.

An approximately 15-foot by 15-foot by 10-foot high motor control building may be located within approximately 50 feet of each production well.

2.1.3 GEOTHERMAL PIPELINES

Geothermal production pipelines bring the geothermal fluid from the production wells to the power plant. Geothermal injection pipelines deliver the cooled geothermal fluid from the power plant to the injection wells.

Approximately 4.72 miles of production pipeline and 2.85 miles of injection pipeline would be constructed within the Jersey Valley Unit Area (see Figure 5). Approximately 3.78 miles of production pipeline and 3.06 miles of injection pipeline would be constructed within the Buffalo Valley Unit Area (see Figure 6).

The production and injection pipeline routes generally follow the shortest distance from each well pad to the next well pad or the power plant in order to minimize the amount of pipe required, reduce heat losses, reduce the energy required to move the fluids, and to minimize the amount of ground disturbance. Additionally, the proposed pipeline routes generally follow existing or proposed roads to facilitate ongoing monitoring and future maintenance.

The final alignment of the pipeline routes would be dictated by the specific wells completed for the project and the need to match fluid characteristics and balance fluid volumes in these pipelines.

Permanent and temporary surface disturbance associated with pipeline construction activities can be found in Table 5.

2.1.3.1 Operation and Maintenance Procedures of Pipeline

The pipelines would be periodically inspected for leak detection, safety and vandalism during normal operations. The pipelines also would be subject to periodic ultrasonic thickness testing to detect any substantial thinning of the pipe wall.

2.1.4 Rights-of-Way for the Power Line and Access Road

The Proposed Action also includes the construction and operation of an approximately 27.59-mile overhead electrical transmission line (NVN-87409) originating at the proposed Jersey

Valley power plant and terminating at the proposed SPPCo. Bannock substation (see Figure 4). The Buffalo Valley power plant would "tie-in" to the proposed transmission line (see Figure 4).

An additional ROW is requested from Lander County's Buffalo Valley Road to the proposed SPPCo. Bannock substation and/or switching station. The proposed road is located seven (7) miles west of the junction of Highway 305 and the Buffalo Valley junction, and extends south approximately 0.50 miles to the substation and/or switching station (see Figure 14).

2.1.5 Transmission Line Corridor

Ormat is also proposing to construct, operate and maintain an approximately 27.59 mile overhead 120 kV transmission line, originating at the proposed Jersey Valley power plant site and terminating at a proposed SPPCo. Bannock substation in the NE1/4, SE1/4 Section 28, T30N, R43E; which is located on private lands (see Figure 4). The proposed transmission line would require a 200-foot wide ROW (90-foot permanent width and an additional 110-foot temporary width required for construction).

The proposed Buffalo Valley power plant would "tie-in" to the proposed ROW in the SW1/4, SE1/4 Section 24 T.29N. R.41E. Should the Jersey Valley power plant not be constructed, the proposed transmission line would originate at the Buffalo Valley power plant and terminate at the proposed SPPCo. Bannock substation. Design characteristics can be found in Table 3.

Table 3: Transmission Line Typical Design Characteristics

Line length	Approximately 27.59 miles
Type of structure	Single pole
Structure height	Single pole: 55 to 70 feet
Span length	Single pole: Approximately 300 to 400 feet
Number of structures/mile	Single pole: Approximately 14 to 18 per mile
Voltage	120,000

2.1.5.1 Facility Design Factors and Additional Components

The transmission line would be designed to meet all temperature, wind, voltage, span and structure height clearance requirements. The proposed transmission line would also provide raptor protection in compliance with the standards described in the "Suggested Practices for Raptor Protection on Power Lines, The State of the Art in 2006" (APLIC 2006). To prevent perching, a cone (Kaddas Enterprises type KE1058 or equal) would be installed on the top of each transmission line pole along the entirety of the transmission line (see Figure 15 and Figure 16).

Staging areas would be located on public land and would be used to temporarily store materials required for construction (see Table 4 and Figure 7).

Table 4: Staging Area Locations

Staging Areas	Township/Range	Legal Description (Section Number & Aliquot Part)
Jersey Valley Power Plant Area	T.27N., R.40E.	SE1/4, SE1/4 Section 28
Buffalo Valley Power Plant Area	T.29N., R.41E.	SW1/4, SE1/4 Section 24
NVE Substation Area	T.30N., R.43E.	NW1/4, NW1/4 Section 19

Pulling stations, required for installing the conductors, would be located approximately every two to three miles within the ROW. Pulling of the conductors would be accomplished by trucks capable of off-road travel. Grading or clearing of the surface would occur only when absolutely necessary for safe access or for installing the conductors and would only occur within the proposed ROW. These pulling stations would each be used for only short periods of time during the final construction process and would be reclaimed as necessary upon project completion.

Permanent and temporary surface disturbance associated with transmission line construction activities can be found in Table 5.

2.1.6 Site Access and Road Construction

The Project Areas are accessed by traveling south on State Route 305 from Battle Mountain approximately 11.5 miles to Copper Basin Road. Turn right onto Copper Basin Road and travel southwest for approximately 11 miles. Continue onto County Road 121 for approximately 12 miles. County Road 121 becomes Jersey Valley Road. Continue on Jersey Valley Road for approximately 8 miles. Turn left onto an unnamed dirt road traveling southeast and traverse for approximately 1.5 miles and proceed to the signed area on the west side of the road (see Figure 4).

Numerous other roads and “two-tracks” exist within and around the Jersey Valley Unit Area, Buffalo Valley Unit Area and transmission line corridor. To the extent feasible, existing roads will be utilized for project construction and operation. Existing roads would be maintained as necessary to prevent the formation of deep ruts.

Within the Jersey Valley Unit Area, approximately 4.10 miles of new access roads will be constructed (see Figure 5). Within the Buffalo Valley Unit Area, approximately 0.83 miles of new access roads will be constructed (see Figure 6). All road construction would be approximately 22 feet wide.

Large portions of the proposed transmission line would be constructed along existing roads and/or County maintained roads. However, some two-track roads may be needed along some portions of the proposed transmission line. Portions of approximately 1,910 feet of existing roads in Sections 18-20, T.30N., R.43E. will need to be improved (i.e. widened, graded, or bladed) and/or constructed (see Figure 14). From the southern portion of the existing road to be improved, approximately 1,310 feet of new road would be constructed to access the proposed substation and/or switching station (see Figure 14).

Permanent and temporary surface disturbance associated with access road construction can be found in Table 5.

2.1.6.1 Construction Procedures and Surface Disturbance of the Transmission Line

Transmission line poles would be transported to the staging areas via commercial trucks. Approximately 25 semi-truck-trailer loads would be required to bring the materials to the staging areas. Once at the staging areas, the poles would be transported to individual installation sites via flat bed trucks designed for overland travel.

A standard truck-mounted auger and backhoe would be used to drill the holes for pole installation. The poles would be lifted by crane and installed with the assistance of a boom truck.

Additionally, three existing transmission line poles (NVN-48871) will need to be repaired or replaced in the W1/4 Section 20, T.30N., R.43E.

Construction of the new Bannock Substation would be conducted by SPPCo. Within the substation site, SPPCo. will construct a switching station consisting of 3-120kV breakers, associated switches, take off structures and bus work. This will include all grounding, fencing and control enclosures.

2.1.6.2 Construction Procedures and Surface Disturbance for the Pipelines and Well Fields

The geothermal fluid pipelines would be constructed from seamless, welded-steel pipe. They are expected to range in diameter from 8 inches to 24 inches. Two to three inches of insulation and a protective aluminum sheath would jacket the steel production pipes, increasing the diameter of the finished production pipelines by up to six inches.

Horizontal and/or vertical expansion loops (a square bend in the pipeline approximately 30 feet in length by 30 feet in width) would be constructed about every 250 to 350 feet along the production pipelines. Expansion loops allow the pipeline to flex as it lengthens and shortens due to heating and cooling. Fewer expansion loops are needed along the injection pipelines, as the injection pipelines are subject to less heating and cooling.

The pipelines would be constructed near ground level (averaging about one foot of ground clearance) on steel supports called “sleepers.” Sleepers support the pipeline and are constructed approximately every 30 feet. Table 5 depicts the total disturbed area.

When completed, the top of the new geothermal pipelines would average three feet above the ground surface. However, a number of pipeline lengths could be up to six feet in height to accommodate terrain undulations and to facilitate movement of wildlife and livestock through the wellfield.

Electrical power and instrumentation cables for the wells would then either be installed in steel conduit constructed along the same pipe sleepers or buried in a trench dug along the pipeline route. If the trenching option for the power and control cables is selected, an approximately 12-inch wide trench would be excavated to an average depth of approximately three feet deep along the pipeline sleepers.

The pipelines would be constructed across roads to allow continued vehicle access, either by trenching under the road, or running the roadbed up and over the pipeline. Photo 2 below shows a typical pipeline with electrical cables.

Photo 2: Typical Pipeline with Electrical Cables

2.1.6.3 Operation and Maintenance Procedures for the Transmission Line

Maintenance would include transmission line and pole repair and/or replacement. No routine maintenance would be performed on the transmission line. Ormat would annually inspect the transmission line from a light, off-road vehicle. Repairs and/or facility replacement would transpire, as necessary. Routine travel within the ROW is not expected.

2.1.7 Water Requirements and Source

For activities within the Jersey Valley Unit Area, water required for well drilling could range up to as much as 30,000 gallons per day. Water requirements for grading, construction, and dust control would average substantially less. Construction of the power plant and related facilities would require approximately 5,000 gallons per day (5.60 acre-feet per year) during construction of the power plant.

Water necessary for construction activities within the Jersey Valley Unit Area will be obtained from established private ranch sources Home Station Ranch (NW1/4 Section 7, T.26N., R.40E.) or McCoy Ranch (SE1/4 Section 29, T.26N., R.39E.) and trucked onsite (see Figure 8). Additional water may be obtained from a well owned by the Saval Ranch Company on private lands within the Jersey Valley unit (NW/14, SW1/4 Section 34, T.27N. R.40E.) and piped to the power plant site (see Figure 8). The temporary construction pipeline would be laid on the side of the existing roads and no additional surface disturbance is anticipated.

Up to approximately 325 gallons of water will be consumed per day for the facility operations (0.37 acre-feet per year). This water will be obtained from the established private ranch sources identified above (see Figure 8). This water, used for septic purposes, will be trucked to the power plant and stored onsite. Drinking water will be purchased from a commercial bottled water source.

For activities within the Buffalo Valley Unit Area, water requirements (both construction and operation) would be the same as those associated with the Jersey Valley Project activities.

Water necessary for all of the proposed Project activities within the Buffalo Valley Unit Area would be obtained from an established private ranch source (Saval Ranch, S1/2 Section 10, T.26N., R.39E.) and trucked to each construction or drill site (see Figure 9).

2.1.8 Aggregate Requirements and Source(s)

As much as possible, native materials (derived from grading to balance cut and fill) will be used for site and road building materials.

For activities within the Jersey Valley Unit Area, total aggregate required for the well pad and access road construction is estimated at 40,250 cubic yards. Approximately 92,000 cubic yards of surfacing material may be needed for power plant and pipeline construction. Aggregate would be obtained from an established Lander County aggregate pit in NE1/4, SE1/4, Section 21, T.27N. R.40E. Additionally, the existing pit will be expanded approximately 5.5 acres to the southeast (SW1/4, SW1/4 Section 22, T.27N. R.40E.) to accommodate the Project's aggregate needs (see Figure 5).

For activities within the Buffalo Valley Unit Area, total aggregate required for the well pad and access road construction is estimated at 7,300 cubic yards. Approximately 20,000 cubic yards of surfacing material may be needed for power plant and pipeline construction. Aggregate would be

obtained from either of the two sources identified above or from a private aggregate company located approximately 3 miles south of the town of Battle Mountain.

Permanent and temporary surface disturbance associated with aggregate sources can be found in Table 5.

2.1.9 Work Force and Schedule

Drilling would be conducted by a crew of 9-10 workers with as many as 18 workers on site during short periods. Power plant and pipeline construction would likely require a maximum of up to 50 workers, with an average of 20 workers after grading and excavation. Substation and/or switching station construction would be conducted by approximately 25-30 workers for site and grid layout; thereafter, approximately 5 workers would be needed for construction of the substation and/or switching station. Construction of the transmission line would require approximately 20 workers. Once operating, the Project would have approximately 20 employees. The power plants would be staffed and approximately 5 employees may be onsite at a given time.

Construction of the power plant and well field facilities would require 12 months once all permits are obtained and equipment orders scheduled. Transmission line construction is expected to take approximately 6 months. Commercial operations are anticipated to commence in the fourth quarter of 2010.

2.1.10 Project Decommissioning and Site Reclamation

The estimated life of the Project is 50 years.

Once drilling is complete, approximately half of the drill pad area can be reclaimed, but the remaining half must be kept clear for ongoing operations and the potential need to work on or re-drill the well. The portions of the cleared well sites not needed for operational and safety purposes would be recontoured to a final or intermediate contour that would blend with the surrounding topography as much as possible. Areas able to be reclaimed will be ripped, tilled, or disked on contour, as necessary and reseeded with native grasses and forbs. The stockpiled topsoils will also be spread on the area to aid in revegetation.

At the end of Project operations the wells would be plugged and abandoned as required by BLM regulations and NAC 534.420. Abandonment typically involves filling the well bore with clean, heavy abandonment mud and cement until the top of the cement is at ground level, which is designed to ensure that fluids would not move across these barriers into different aquifers. The well head (and any other equipment) would then be removed, the casing cut off well below ground surface and the hole backfilled to the surface.

All roads would be reclaimed. Reclamation would include recontouring the road back to the original contour, seeding, controlling noxious weeds and may include other techniques to improve reclamation success, such as ripping, scarifying, replacing topsoil, pitting and mulching.

All above-ground equipment, including the power plant and ancillary facilities and the pipelines and their supports, would be removed and reclaimed. Reclamation would include placing fill in any trenches and compacting, regrading cut-and-fill slopes to restore the original contour, replacing topsoil and revegetating in accordance with a reclamation plan.

Poles, conductors, and hardware associated with the 120 kV transmission line would remain in place for future use. When time to be removed, the remaining holes would be filled with soil gathered from the immediate vicinity. The areas where the poles were removed would be raked to match the surrounding topography. Bladed areas would be recontoured and seeded with the appropriate seed mix.

Ormat would prepare a site reclamation plan for BLM approval prior to plan implementation. The plan would address restoring the surface grades, surface drainage, revegetation of cleared areas and weed management. Stormwater diversion would remain in place until successful revegetation is attatined.

2.1.11 Adopted Environmental Protection Measures

Ormat would comply with all special lease stipulations which are applicable to the proposed Project operations on these leases (see Appendix A). In addition, Ormat would implement the following additional environmental protection measures:

- Water would be applied to the ground during the construction and utilization of the drill pads, access roads, and other disturbed areas as necessary to control dust.
- Portable chemical sanitary facilities would be available and used by all personnel during periods of well drilling and/or flow testing, and construction. These facilities would be maintained by a local contractor.
- To prevent the spread of invasive, nonnative species, all contractors will be required to powers wash their vehicles and equipment, including body and undercarriage, prior to entering public lands managed by the BLM.
- All construction and operating equipment would be equipped with applicable exhaust spark arresters. Fire extinguishers would be available on the active sites. Water that is used for construction and dust control would be available for fire fighting. Personnel would be allowed to smoke only in designated areas, and they would be required to follow applicable BLM regulations regarding smoking.
- Cut and fill activities have been minimized through the selection of the power plant site and pipeline routes. Off-site storm water would be intercepted in ditches and channeled to energy dissipaters as necessary to minimize erosion around the power plant. To minimize erosion from storm water runoff, access roads would be maintained consistent with the best management practices applicable to development roads. BLM best management practices for storm water would be followed, as applicable, on public lands.
- Geothermal fluids would not be discharged to the ground under normal operating conditions. Accidental discharges of geothermal fluids are unlikely because of frequent inspections, ultrasonic testing of the pipeline, flow and pressure monitoring and well pump and pipeline valve shutdown features.

- Following project construction, areas of disturbed land no longer required for operations would be reclaimed to promote the reestablishment of native plant and wildlife habitat.
- Any areas containing cultural resources of significance would be avoided, or the potential for impacts mitigated in a manner acceptable to the BLM. Ormat employees, contractors, and suppliers would be reminded that all cultural resources are protected and if uncovered shall be left in place and reported to the Ormat representative and/or their supervisor.
- A buffer of approximately 30 to 50 meters would be established around eligible and unevaluated cultural sites that lie very close to project activities. When initial construction is close to the buffered areas, an archaeological monitor would be present to insure that eligible and unevaluated cultural sites are not disturbed.
- The power plant, pipelines, wellheads, pump motors and motor control buildings would each be painted an appropriate color to blend with the area and minimize visibility.
- The proposed transmission line would also provide raptor protection in compliance with the standards described in the "Suggested Practices for Raptor Protection on Power Lines, The State of the Art in 2006."
- An anti-perching device, (a cone, Kaddas Enterprises type KE1058 or equal) would be installed on the top of each transmission line pole along the entirety of the transmission line (see Figure 15 and Figure 16).
- All power poles will utilize BLM-approved raptor deterrents.
- Bird flight diverters will be attached to the transmission line conductors located immediately over the open water areas of the Jersey Valley and Buffalo Valley hot springs, and out to approximately 100 feet on each side of the hot springs. The spacing of the diverters will be approximately 15 feet between each device.
- Should construction be planned within the greater sage-grouse wintering season, prior to the commencement of construction, areas proposed for disturbance will be surveyed by a qualified biologist to determine if wintering concentrations of sage-grouse exist. Any wintering concentrations of birds will be avoided by 0.6 miles.
- Construction noise would be minimized through practices which avoid or minimize actions which may typically generate greater noise levels, or generate distinctive impact noise.
- Ormat will obtain and comply with an Underground Injection Control (UIC) permit, as appropriate.

2.2 ALTERNATIVES

NEPA requires that a reasonable range of alternatives to the Proposed Action be considered that could feasibly meet the objectives of the Proposed Action as defined in the purpose and need for the project [40 CFR 1502.14(a)]. The range of alternatives required is governed by a "rule of reason" (i.e., only those feasible alternatives necessary to permit a reasoned choice need be considered). Reasonable alternatives are those that are practical or feasible based on technical and economic considerations [46 Federal Register 18026 (March 23, 1981), as amended; 51 Federal Register 15618 (April 25, 1986)].

Alternatives to the Proposed Action must be considered and assessed whenever there are unresolved conflicts involving alternative uses of available resources (BLM 1988 and BLM 2008a). One alternative to the Proposed Action has been identified to reduce or avoid potential effects to bat species within the Jersey Valley Unit Area.

2.2.1 Alternative 1

Alternative 1 differs from the Proposed Action only within the Jersey Valley Unit Area. Whereas the wellfield remains the same under Alternative 1, the power plant, pipeline system, road network, construction water pipeline alignment and transmission line corridor have been relocated (see Figure 10, Figure 11 and Figure 12).

The Alternative 1 power plant would be located on approximately 9-acres in the SE1/4, NW1/4 Section 28 T.27N. R.40E. (see Figure 10).

Approximately 3.17 miles of production pipeline and 3.03 miles of injection pipeline are proposed under Alternative 1 (see Figure 10). The Alternative 1 production pipeline is approximately 0.55 miles longer than the Proposed Action. The Alternative 1 injection pipeline is approximately 0.18 miles longer than the Proposed Action.

Approximately 4.71 miles of new road would be constructed under Alternative 1 (Figure 10), as opposed to 4.10 miles constructed under the Proposed Action.

The transmission line corridor is slightly different from the Proposed Action in that the transmission line originates at the power plant in the SE1/4, NW1/4 Section 28 T.27N. R.40E., and follows the county road due north (see Figure 12). When the Alternative 1 transmission line enters Section 16, T.27N. R.40E., the route becomes identical to the Proposed Action alignment. The length of the Alternative 1 alignment is virtually identical to the Proposed Action alignment and the associated surface disturbances are the same.

Within the Buffalo Valley Unit Area, the Proposed Action and Alternative 1 are identical.

Permanent and temporary surface disturbance comparing the Proposed Action with Alternative 1 can be found in Table 5.

2.3 SURFACE DISTURBANCE SUMMARY

A comparison of the temporary and permanent surface disturbance associated with the Proposed Action and Alternative 1 can be found in Table 5.

Table 5: Proposed Action and Alternative 1 Surface Disturbance

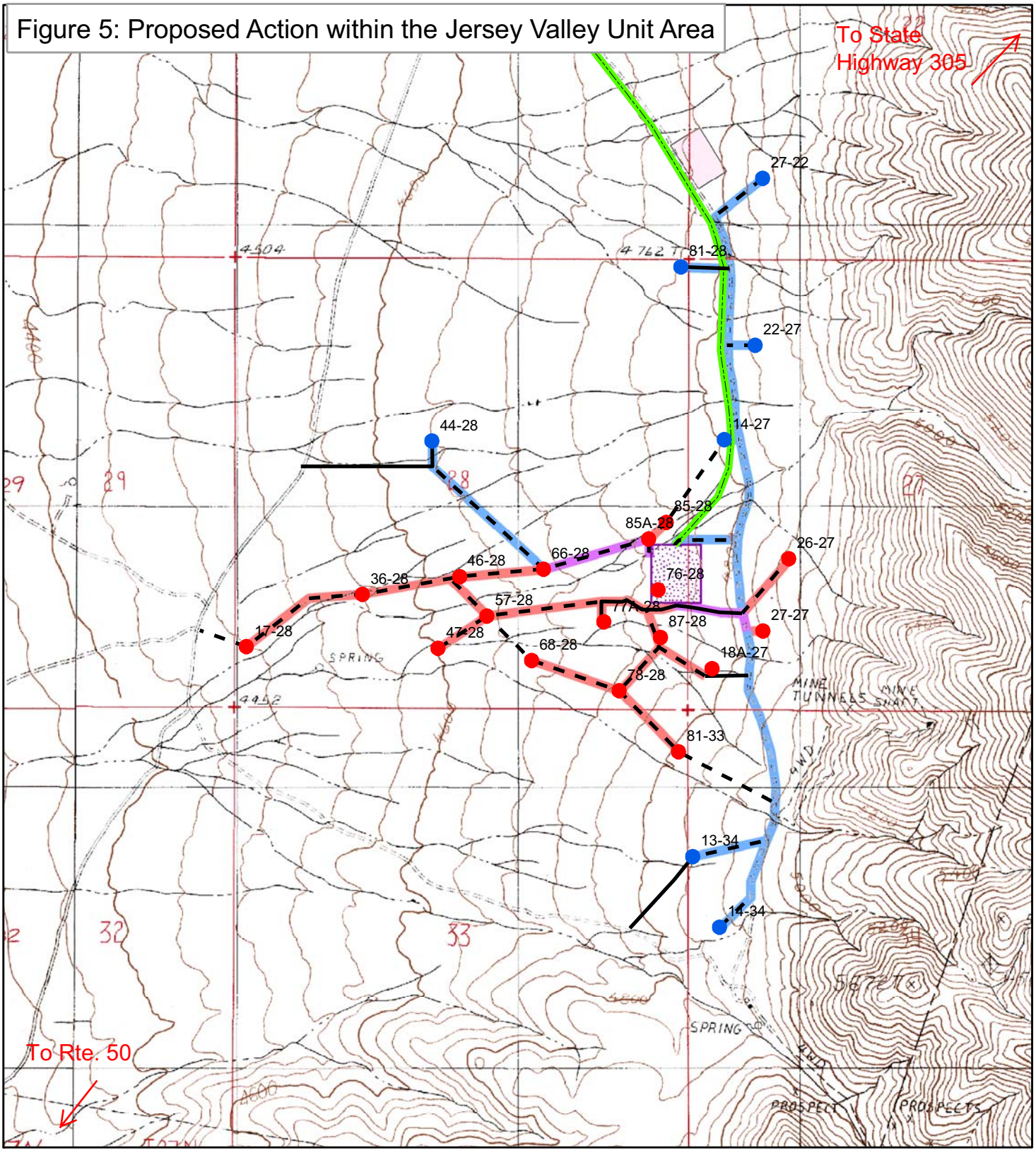
	Proposed Action		**Alternative 1**	
	Temporary	**Permanent**	**Temporary**	**Permanent**
Jersey Valley Unit Area				
Injection Wells	28.70	14.35	28.70	14.35
Production Wells	69.70	34.85	69.70	34.85
Injection Pipeline	6.91	1.73	7.35	1.84
Production Pipeline	11.45	2.86	8.99	2.25
Power Plant	9.0	9.0	9.0	9.0
Access Roads	9.95	4.97	11.43	5.72
Aggregate Source	5.50	5.50	5.50	5.50
SUB-TOTAL	***141.21***	***73.26***	***140.67***	***73.51***
Buffalo Valley Unit Area				
Injection Wells	20.50	10.25	20.50	10.25
Production Wells	41.0	20.50	41.0	20.50
Injection Pipeline	7.42	1.85	7.42	1.85
Production Pipeline	9.17	2.29	9.17	2.29
Power Plant	9.00	9.00	9.00	9.00
Access Roads	2.47	1.17	2.47	1.17
SUB-TOTAL	***89.56***	***45.06***	***89.56***	***45.06***
Transmission Line Corridor				
Pole Placement	13.85	0.02	13.85	0.02
Staging Areas	6.0	0	6.0	0
Substation	5.75	5.75	5.75	5.75
Pole Reconstruction	0.69	0	0.69	0
Access Roads	0.78	0.58	0.78	0.58
SUB-TOTAL	***27.07***	***6.35***	***27.07***	***6.35***
TOTAL	**257.84**	**124.67**	**257.30**	**124.92**

Total permanent surface disturbance is slightly (0.25 acre) greater with Alternative 1.

No Action Alternative

The No Action Alternative would occur if Ormat was prevented from implementing the Project as proposed on federal lands, and the environmental effects from implementation of the Project would not occur as proposed. Implementation of the No Action Alternative would not meet Ormat's purpose and need for the proposed Project. Selection of the No Action Alternative may also impair geothermal development rights granted to Ormat through the issuance of the Unit(s).

Figure 5: Proposed Action within the Jersey Valley Unit Area



LEGEND

- Injection Well
- Production Well
- Existing Access
- Proposed Access
- 120 kV Power ROW - Proposed Action
- Power Plant Location
- Proposed Gravel Source
- Injection Pipeline
- Production Pipeline
- Injection and Production Pipelines

0 0.25 0.5 1 Miles

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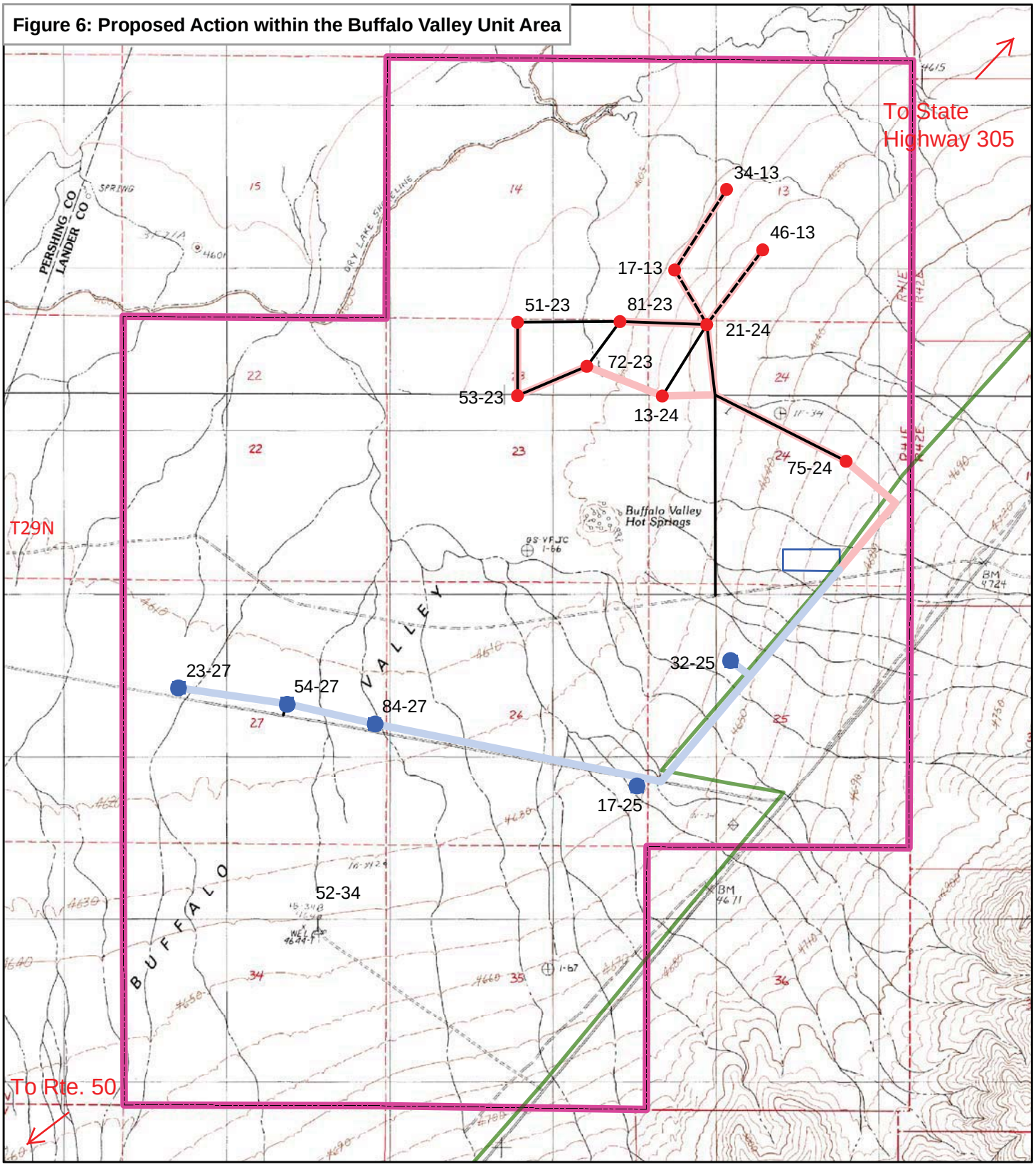
The data shown on the map uses the Universal Transmercator (Zone 11N) Coordinate system and uses the NAD83 projection.

Map Date: November 19, 2009

N W E S

Figure 6: Proposed Action within the Buffalo Valley Unit Area



LEGEND

- Injection Well
- Production Well
- Existing Access
- New Access
- Injection Pipeline
- Production Pipeline
- 120 kV Power ROW - Proposed
- Proposed Buffalo Valley Power Plant Location
- Buffalo Valley Geothermal Unit Area (NVN-838484X)

0 0.25 0.5 1 Miles

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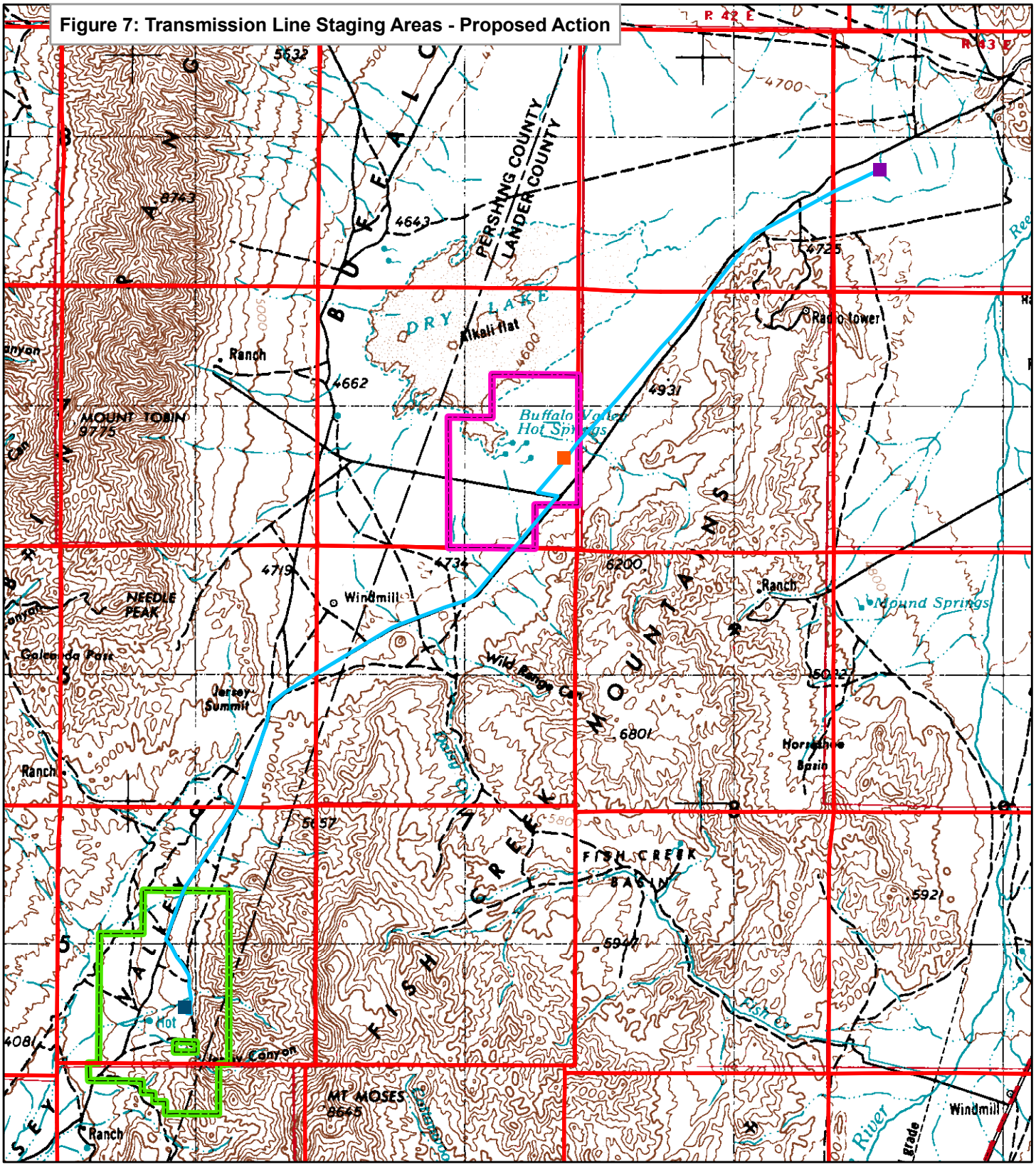
N W E S

Figure 7: Transmission Line Staging Areas - Proposed Action



LEGEND

- Buffalo Valley Staging Area
- Jersey Valley Staging Area
- Bannock Substation
- 120 kV Power ROW - Proposed
- Buffalo Valley Geothermal Unit Area (NVN-838484X)
- Jersey Valley Geothermal Unit Area (NVN-83483X)

0 1.5 3 6 Miles

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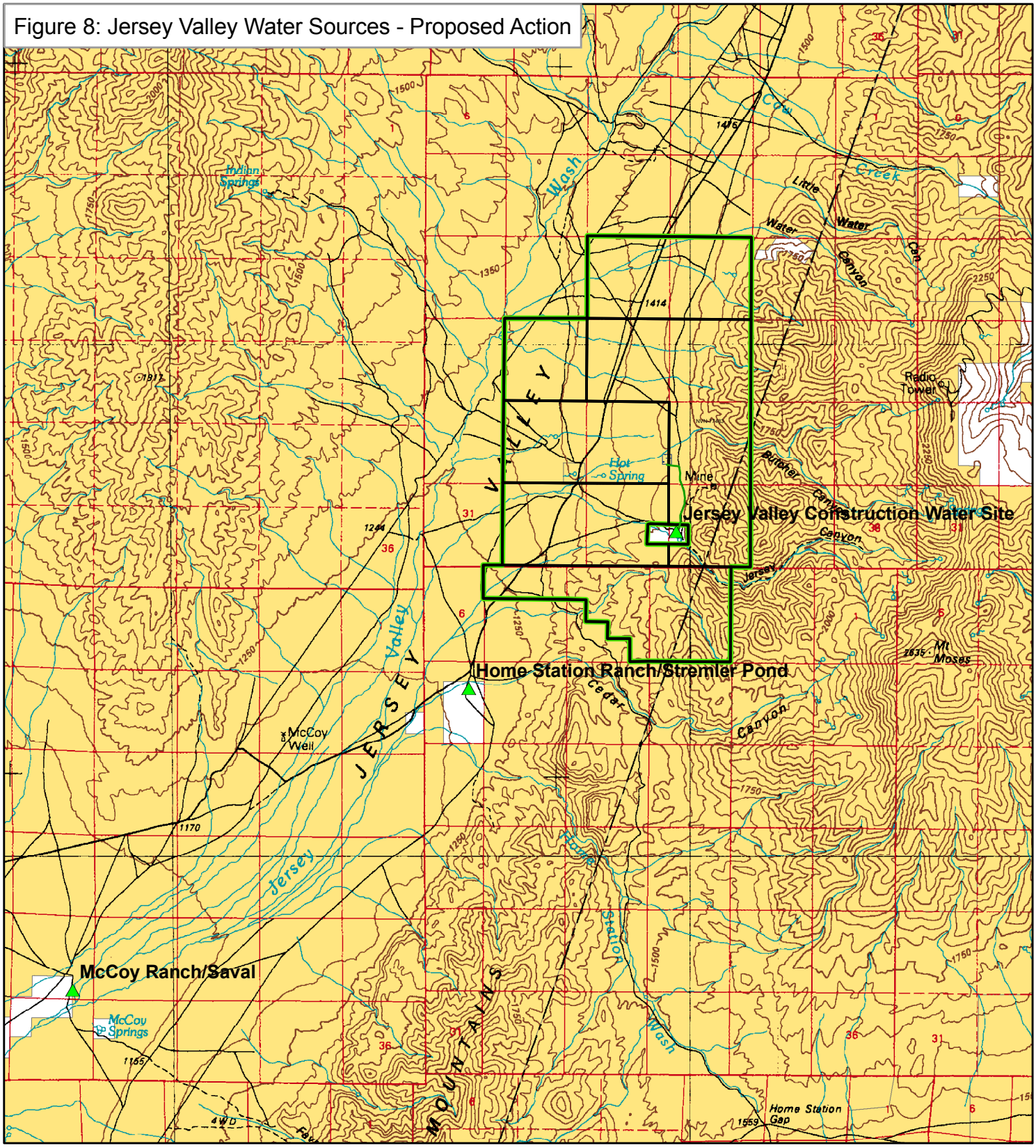
N W E S

Figure 8: Jersey Valley Water Sources - Proposed Action



LEGEND

- PossibleWaterSources
- Proposed Power Plant (9.2 acres)
- Proposed Temporary Construction Water Pipeline
- Geothermal Lease Boundary
- Jersey Valley Geothermal Unit Area (NVN-83483X)
- Bureau of Land Management Land
- Private Land

0 1 2 4 Miles

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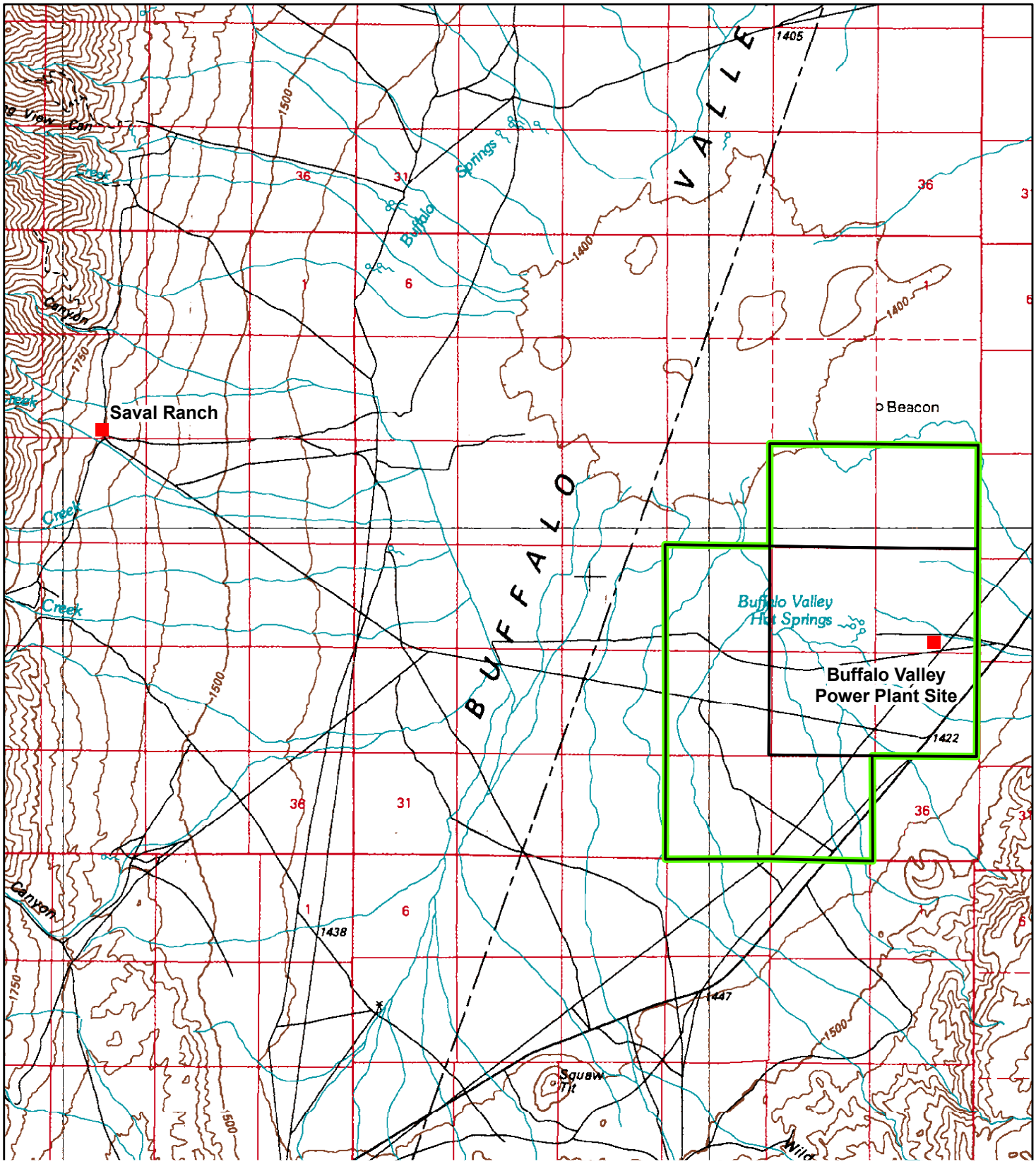

Figure 9: Buffalo Valley Water Sources

LEGEND

- Possible Water Sources
- Buffalo ValleyLease Boundary
- Buffalo Valley Geothermal Unit Boundary

"No warranty is made by the Bureau of Land Management as to the accurracy, reliability, or completeness of these data for individual use or aggregate use with other data.

The data shown on the map uses the Universal Transmercator (Zone 11N) Coordinate system and uses the NAD83 projection.

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N
W E
S

0 0.5 1 2 Miles

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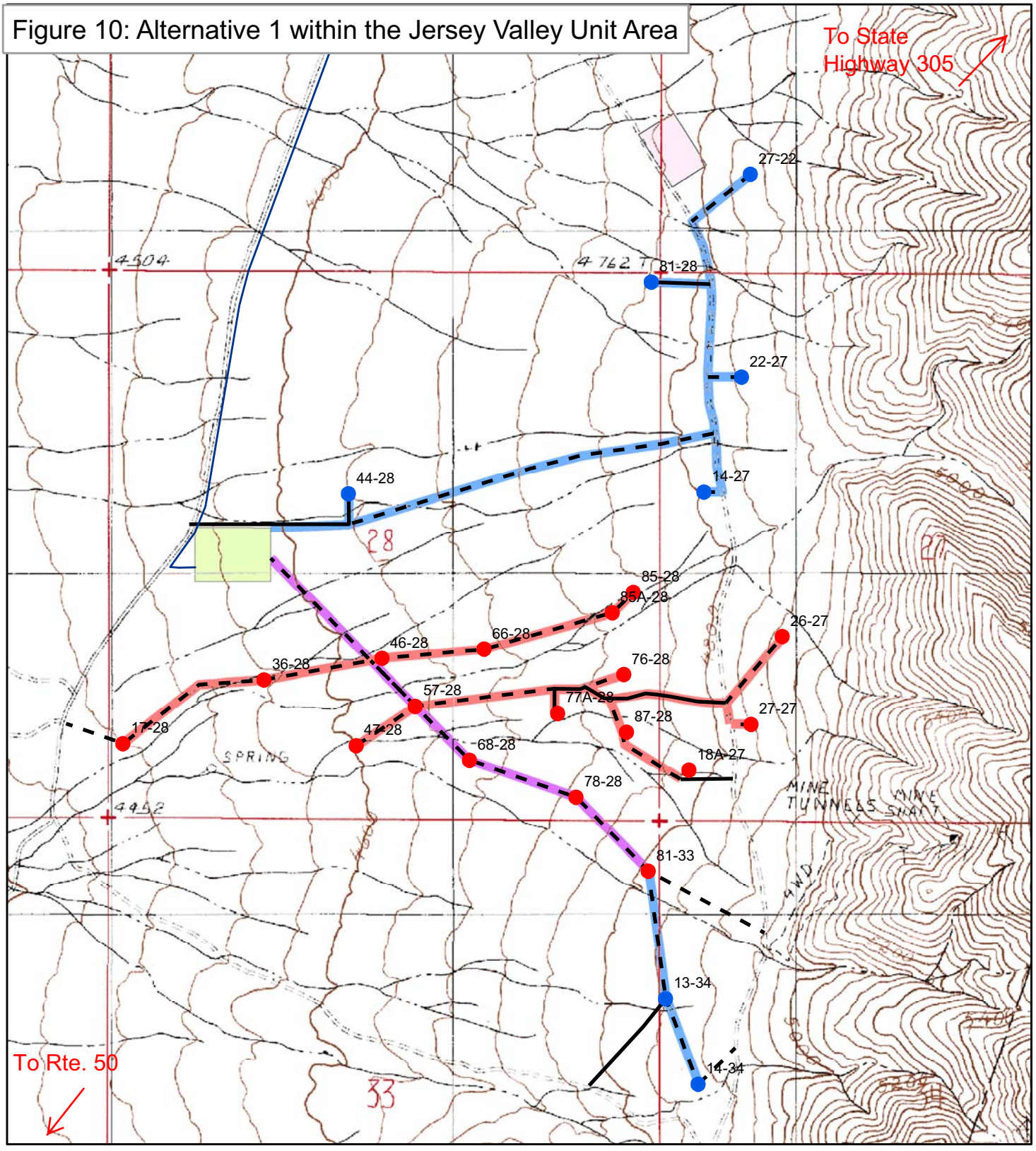
Figure 10: Alternative 1 within the Jersey Valley Unit Area



T27N, R40E

LEGEND

- Alternative Power Plant Location
- Injection Pipeline
- Injection and Production Pipelines
- Production Pipeline
- Injection Well
- Production Well
- Proposed 120kV Transmission Line - Alternative
- Existing Access
- Proposed Access
- Proposed Gravel Source

0 0.25 0.5 1 Miles

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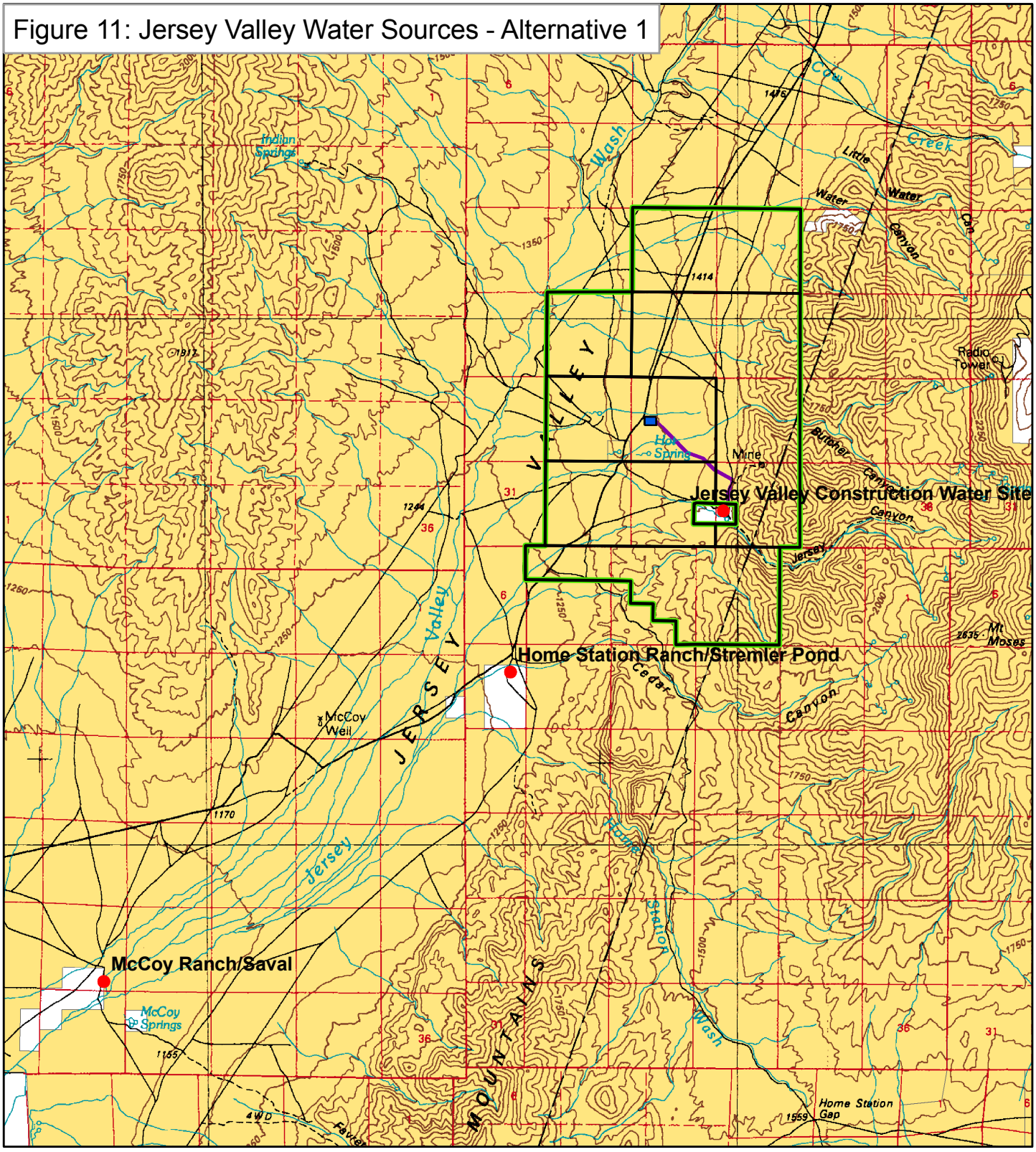
Map Date: November 30, 2009

N W E S

Figure 11: Jersey Valley Water Sources - Alternative 1



LEGEND

- Possible Water Source
- Geothermal Lease Boundary
- Jersey Valley Geothermal Unit Area (NVN-83483X)
- Alternative Power Plant Location
- Temporary Construction Pipeline
- Bureau of Land Management Land
- Private Land

0 1 2 4 Miles

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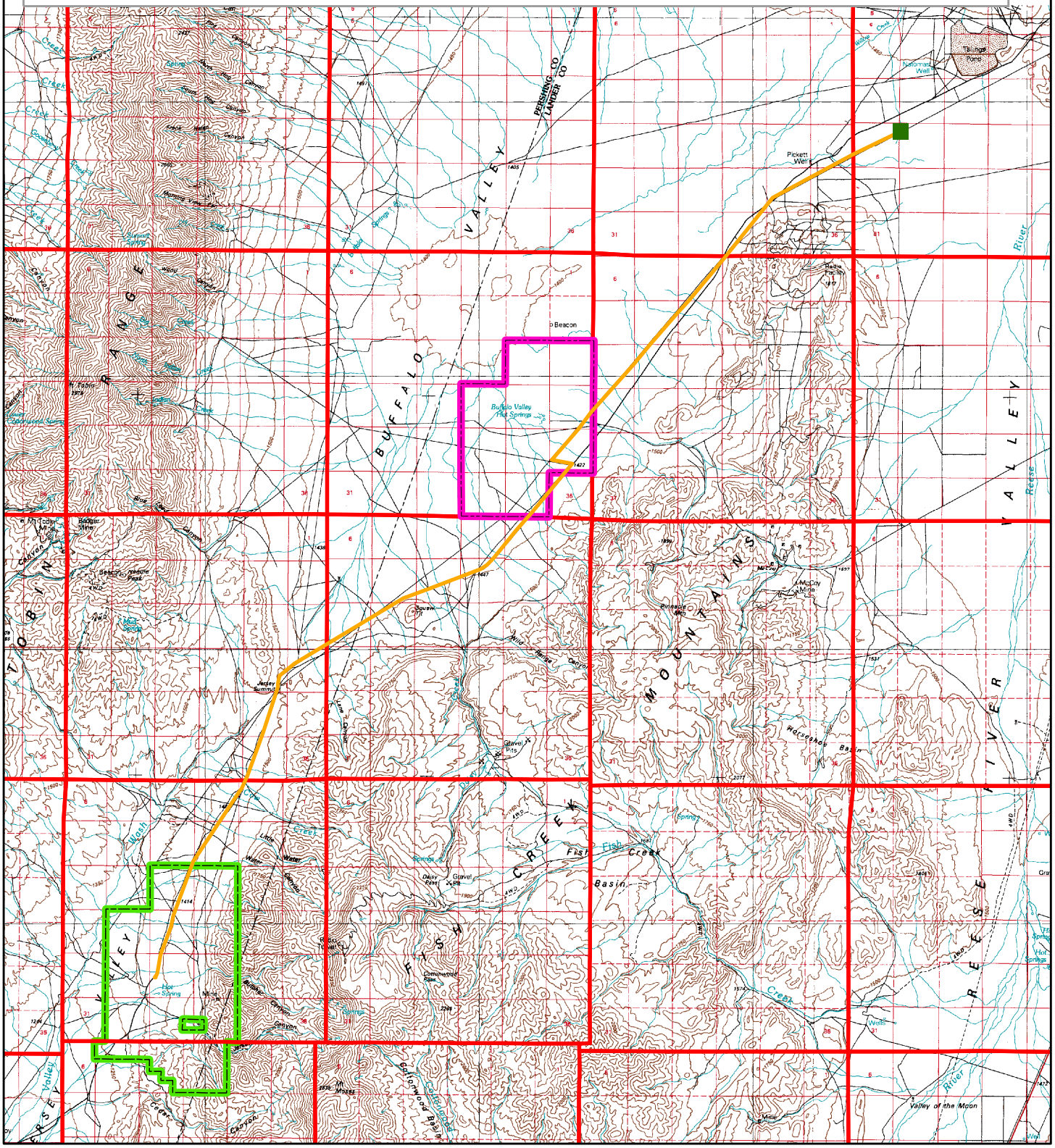
The data shown on the map uses the Universal Transmercator (Zone 11N) Coordinate system and uses the NAD83 projection.

Map Date: November 22, 2009

N W E S

Figure 12: Jersey Valley Unit Area, Buffalo Valley Unit Area and Transmission Line Corridor - Alternative 1



LEGEND

- Bannock Substation - Proposed
- Proposed Power ROW 120kV - Alternative 1
- Buffalo Valley Geothermal Unit Area (NVN-838484X)
- Jersey Valley Geothermal Unit Area (NVN-83483X)

0 1.5 3 6 Miles

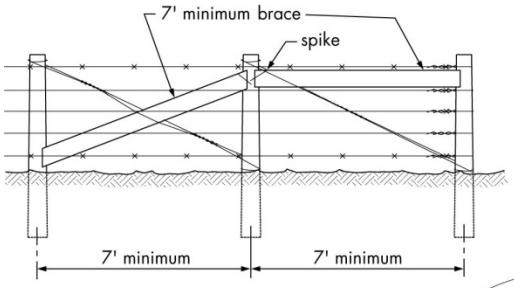
United States Department of the Interior
Bureau of Land Management
Mount Lewis Field Office
50 Bastian Road
Battle Mountain, NV 89820

The data shown on the map uses the Universal Transmercator (Zone 11N) Coordinate system and uses the NAD83 projection.

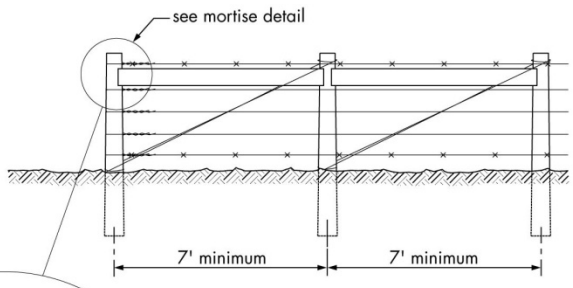
Map Date: November 22, 2009

N W E S

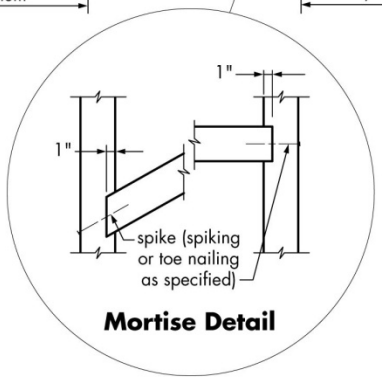
Figure 13: Recommended Construction Standards for Exclosure Fences in Livestock Areas



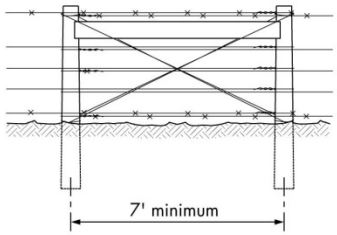
End Panel–Type 1



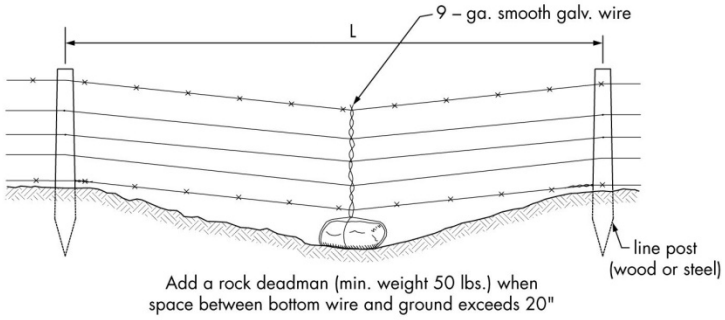
End Panel–Type 2



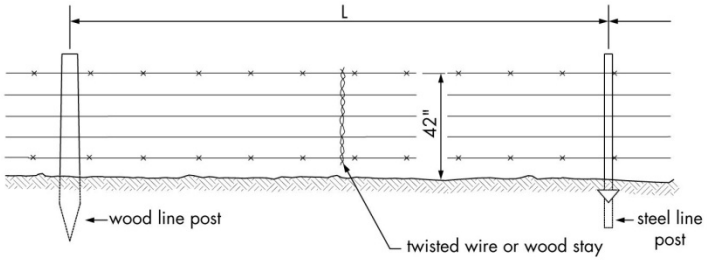
Mortise Detail



Stress Panel



Panel at Minor Depression



Line Panels

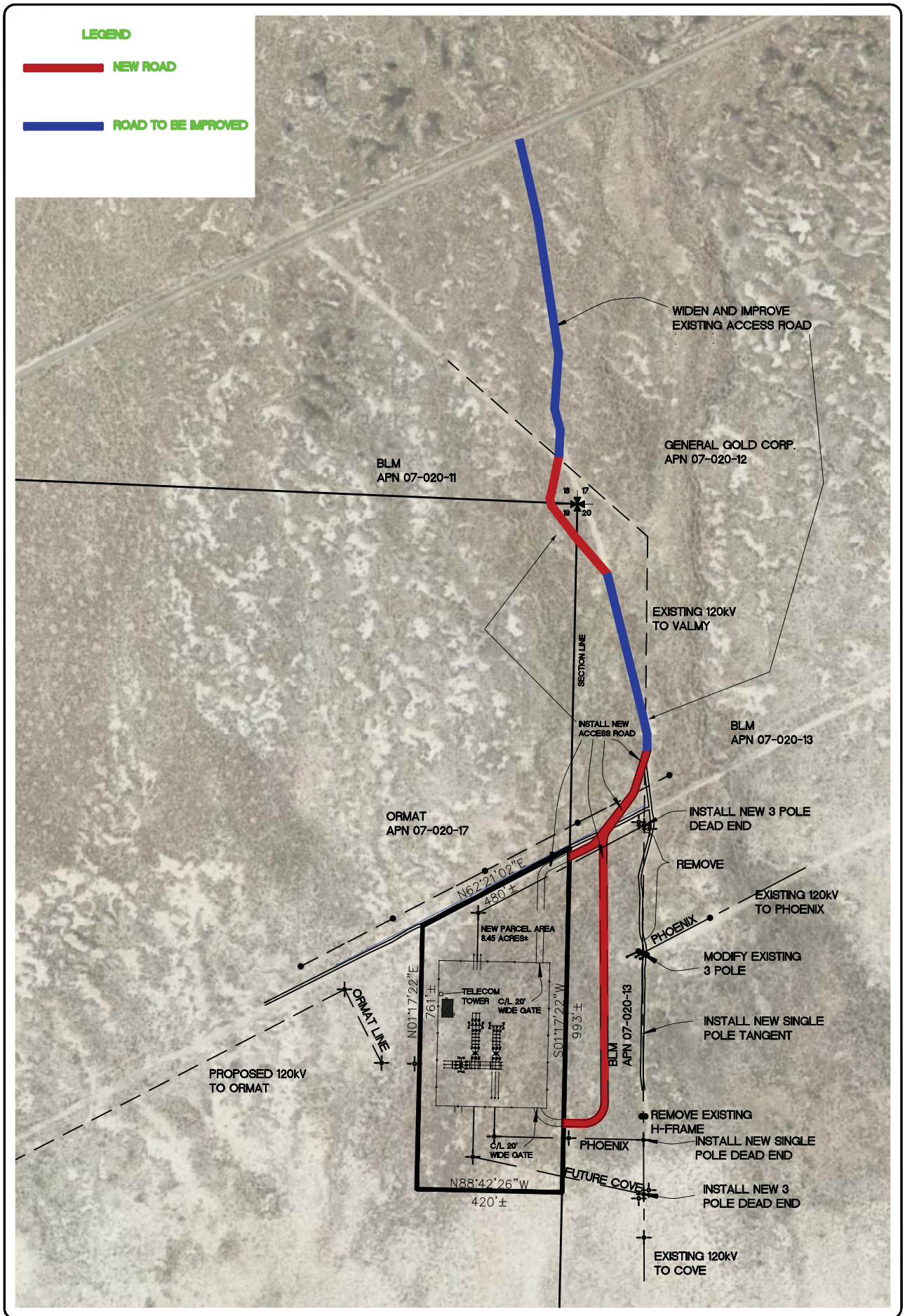
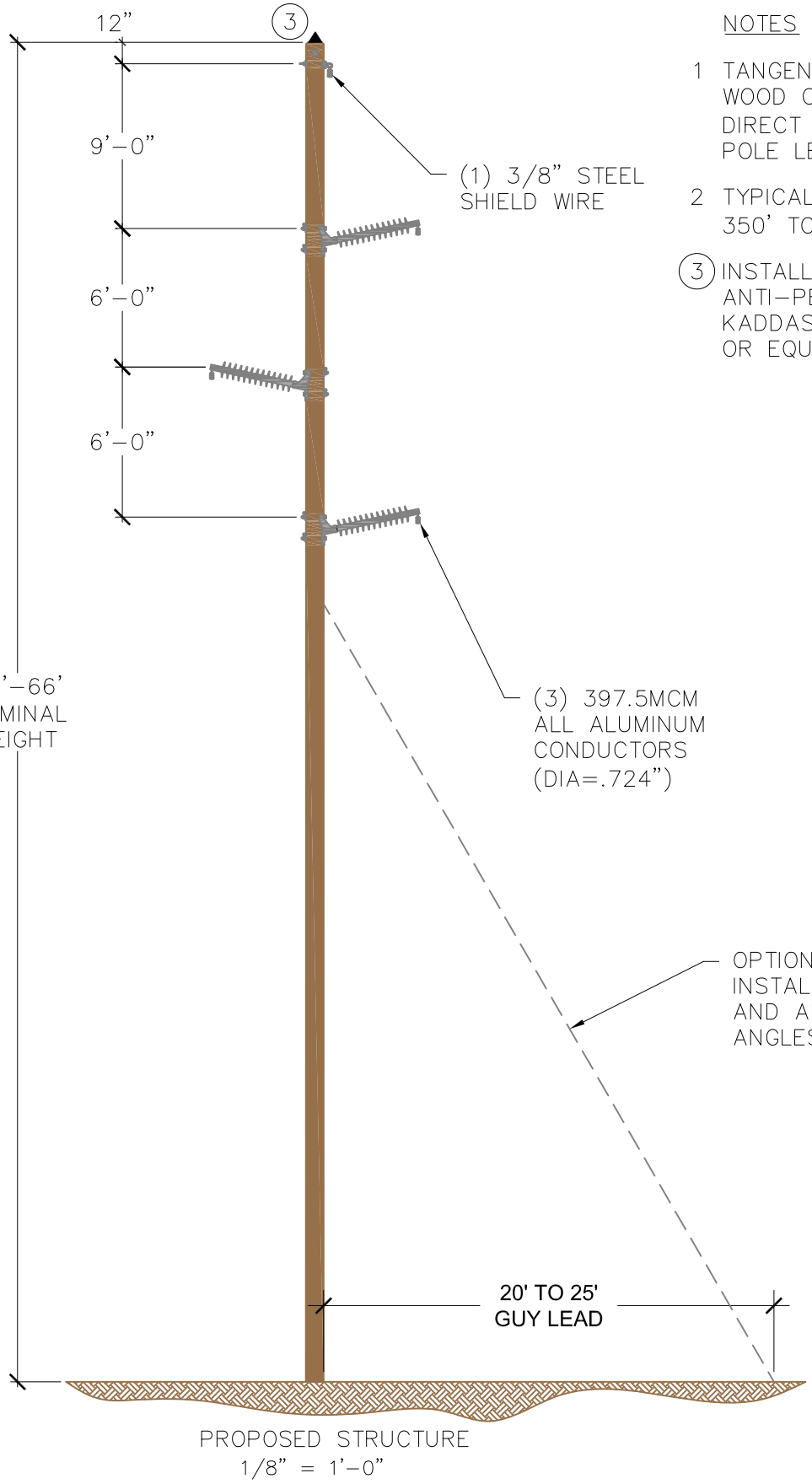


Figure 14: Proposed Substation Layout and Access

NVEnergy
6100 NEIL RD.
RENO, NV 89511
775-834-4011

1" = 250'

SURVEYOR:	LDL
PHONE NUMBER:	775-834-5391
PROJECT NUMBER:	LR4540ZLR2
PROJECTION:	NVSPC 83 US FT



PROPOSED STRUCTURE
1/8" = 1'–0"

NOTES

1 TANGENT STRUCTURES WILL BE WOOD OR WEATHERING STEEL POLES, DIRECT BURIED 10% +2' OF TOTAL POLE LENGTH.

2 TYPICAL SPAN LENGTHS WILL BE 350' TO 400'

(3) INSTALL POLE TOP CONE FOR ANTI–PERCHING AS REQUIRED. KADDAS ENTERPRISES TYPE KE1058 OR EQUAL.

NVEnergy

DWN.	ENG'R.	CHK'D.	APPRV.	DATE	REV.
JDR			JAL	04/10	

ORMAT JERSEY VALLEY 120 kV LINE

Figure 15: Single Pole Structure

SHEET 1 OF 1

DRAWING NUMBER

ST274

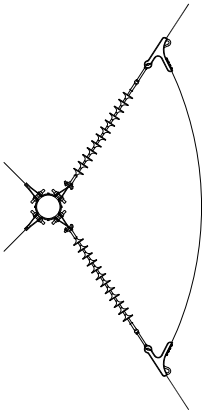
NOTES

1 HEAVY ANGLE STRUCTURES WILL BE WOOD OR WEATHERING STEEL POLE, DIRECT BURIED 10% +2' OF TOTAL POLE LENGTH.

2 TYPICAL SPAN LENGTHS WILL BE 350' TO 400'

3 INSTALL (4) ANCHORS AND (8) GUY WIRES PER STRUCTURE

(4) INSTALL POLE TOP CONE FOR ANTI-PERCHING AS REQUIRED. KADDAS ENTERPRISES TYPE KE1058 OR EQUAL.



PROPOSED STRUCTURE
1/8" = 1'-0"

NVEnergy					
DWN.	ENG'R.	CHK'D.	APPRV.	DATE	REV.
JDR			JAL	04/10	

ORMAT JERSEY VALLEY 120 kV LINE

Figure 16: Single Pole Angle Structure

SHEET 1 OF 1

DRAWING NUMBER

HA282

3 AFFECTED ENVIRONMENT/ENVIRONMENTAL CONSEQUENCES

To comply with NEPA, the BLM is required to address specific elements of the environment that are subject to requirements specified in statute or regulation or by executive order (BLM 1988 and BLM 2008a). Table 6 outlines the elements that must be addressed in all environmental assessments, as well as other resources deemed appropriate for evaluation by the BLM, and denotes if the Proposed Action or No Action Alternative affects those elements.

Table 6: Supplemental Authorities

Element	Present Yes/No	Affected Yes/No	JUSTIFCATION
Air Quality	YES	YES	See section 3.2
Cultural Resources	YES	NO	See section 3.3
Environmental Justice	NO	NO	No minority or low income populations would be disproportionally affected by the proposed Project.
Fish Habitat	NO	NO	There is no fish habitat in the Jersey Valley Unit Area, Buffalo Valley Unit Area or transmission line corridor.
Floodplains	NO	NO	The only FEMA-designated 100-year floodplains are in the very northern portion of the Buffalo Valley Unit Area. All project components are located south of the mapped floodplains.
Forests and Rangeland	YES	YES	There is no forestry within either the Jersey Valley Unit Area, Buffalo Valley Unit Area or within the transmission line corridor. See section 3.12 for rangeland information.
Migratory Birds	YES	YES	See section 3.5
Native American Religious Concerns	YES	YES	See section 3.4
Threatened, and/or Endangered, Species	YES	NO	See section 3.5
Wastes, Hazardous or Solid	YES	YES	See section 3.11
Water Quality Drinking–Ground	YES	YES	See section 3.9
Wetlands and Riparian Zones	YES	YES	See section 3.10
Wild and Scenic Rivers	NO	NO	There are no wild and scenic rivers in the Jersey Valley Unit Area, Buffalo Valley Unit Area or transmission line corridor.

Element	Present Yes/No	Affected Yes/No	JUSTIFCATION
Wilderness	NO	NO	There are no wilderness areas within the Jersey Valley Unit Area, Buffalo Valley Unit Area or the transmission line corridor

Other resources of the human environment that have been considered for this EA are listed in Table 7 below.

Table 7: Other Resources

Other Resources	Present Yes/No	Affected Yes/No	JUSTIFICATION
Geology and Minerals	YES	NO	Geology and Minerals would not be adversely affected by implementation of the Proposed Action. Geothermal resources are a leasable mineral and given that the resource is not consumed during plant operations, geothermal resources should not be affected.
Paleontological Resources	YES	NO	The southern portion of the Jersey Valley Unit area may host supporting geologic structures for vertebrate paleontological resources. However the Project is located north of these geological structures, and is not projected to affect vertebrate paleontological resources.
Soils	YES	YES	See section 3.7
Invasive, Nonnative Species and Noxious Weeds	YES	YES	See section 3.6
Vegetation	YES	YES	See section 3.8
Wildlife Resources	YES	YES	See section 3.5
Recreation	YES	YES	See section 3.13
Visual Resources	YES	YES	See section 3.14
Socio-Economic Values	YES	YES	See section 3.15
Special Status Species	YES	YES	See section 5.50
Areas of Critical Environmental Concern	NO	NO	The proposed Projects are not located in or near any ACECs.
Prime or Unique Farmlands	NO	NO	There are no prime or unique farmlands within the Jersey Valley Unit Area, Buffalo Valley Unit Area or transmission line corridor.
Wild Horse and Burro	NO	NO	The Jersey Valley Unit Area and the proposed transmission line are not located within a Herd Management Area (HMA). The Buffalo Valley Unit Area has a very small portion of

Other Resources	Present Yes/No	Affected Yes/No	JUSTIFICATION
			the Augusta HMA that slightly intrudes on the geothermal lease area. The proposed Buffalo Valley plant and appurtenant facilities lay completely outside the Augusta HMA.
Land Use Authorizations	YES	YES	See section 3.16

3.2 AIR QUALITY

3.2.1 Affected Environment

The Nevada Department of Conservation and Natural Resources (NDCNR), Division of Environmental Protection (NDEP), Bureau of Air Pollution Control (BAPC) has been delegated responsibility by both the federal Environmental Protection Agency (USEPA) and the State of Nevada to regulate air pollution and emissions of air pollutants in all areas of the State, other than Clark and Washoe Counties.

Air quality in Lander and Pershing Counties has been designated as "attainment/unclassified" (which means it either meets, or is assumed to meet, the applicable federal ambient air quality standards) for all standard ("criteria") air pollutants [ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, inhalable particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), lead particles and hydrogen sulfide] (U.S. EPA 2009).

Neither the Jersey Valley Unit Area, the Buffalo Valley Unit Area, nor the transmission line corridor are located in or adjacent to any mandatory Class I (most restrictive) Federal air quality areas, U.S. Fish and Wildlife Service Class I air quality units, or American Indian Class I air quality lands.

3.2.2 Environmental Consequences

3.2.2.1 Proposed Action

The primary pollutant of concern during construction activities would be particulates in the form of fugitive dust. Fugitive dust would be generated from earth-moving activities and travel on unpaved roads during power plant, drill pad, pipeline, road construction and drilling activities. Based on implementation of environmental protection measures specified by Ormat, water and gravel would be applied to the ground as necessary to control dust (see Section 2.1.11). Each of the well pads, access roads and the power plant site would be surfaced with aggregate to minimize dust. This would minimize fugitive dust emission during construction activities.

The dust which could be generated when drilling with air would be controlled by a separator/muffler, and only the air and water vapor would be discharged to the air.

An NDEP-BAPC Surface Area Disturbance Permit, documenting the areas of proposed disturbance and the best practical dust control methods to be used, will be required for the Project(s) because the surface disturbed by either of the Projects would be greater than 5 acres. Best practical dust control methods applicable to the project activities include use of water trucks to spray water on disturbed areas on a regular basis; pre-watering of areas to be disturbed; graveling of roadways, storage areas and staging areas; posting and limiting vehicle speeds to 10 to 15 miles per hour, and use of wind fences to reduce wind impacts. Implementation of the applicable best practical dust control methods, through compliance with the Surface Area Disturbance Permit, would minimize fugitive dust emissions during construction, operation and decommissioning of the project.

Combustion emissions of criteria air pollutants [nitrogen dioxide (NO_2), sulfur dioxide (SO_2), carbon monoxide (CO), and particulate matter less than or equal to 10 microns in diameter (PM_{10})], criteria air pollutant precursors [volatile organic compounds (VOCs)] and air toxics (small quantities of diesel PM, acetaldehyde, benzene, and formaldehyde) would be released during well drilling and construction activities from the diesel engines used.

Small quantities of naturally occurring non-condensable gases, such as carbon dioxide (CO_2), hydrogen sulfide (H_2S), nitrogen (N_2), and methane (CH_4), would be emitted to the air during geothermal well testing. With a binary power plant, some of the binary working fluid (pentane) would be released to the atmosphere from gaskets, rotating seals, and flanges during operations. Also during normal operations, a small quantity of air enters the pentane loop in the air-cooled condenser. This air leaked into the pentane loop is discharged back to the atmosphere through a stack, along with a small quantity of pentane. During major maintenance activities on the pentane side of the binary power plant units, the liquid pentane would first be transferred to the pentane storage tank. However, not all of the pentane can be removed in this manner, and the residual pentane would be discharged to the atmosphere when the binary power plant unit is opened. All of these releases, estimated to average about 12 tons per year, are regulated through a permit issued by BAPC to ensure that these emissions do not result in ambient concentrations of ozone (which can be created from the reaction of ambient concentrations of hydrocarbons and NO_x) in excess of the applicable AAQS.

3.2.2.2 Alternative 1

The air quality impacts from construction, operation, maintenance and reclamation of Alternative 1 would be identical to those described for the Proposed Action.

3.3 CULTURAL RESOURCES

3.3.1 Affected Environment

Cultural resource surveys were conducted by Kautz Environmental in 2008 and 2009. The area surveyed (area of potential effect, APE) consisted of two large blocks, one in Lander County totaling 4,146 acres, and one in Pershing County totaling 2,493 acres, as well as a transmission line corridor totaling 1,282 acres (Kautz 2009).

The survey resulted in the identification and evaluation of 99 archaeological sites, seven of which were previously recorded resources. These include 62 historic sites, 33 prehistoric sites and 4 sites which contain both prehistoric and historic components. In addition to the archaeological sites, 161 isolated finds were also observed and recorded.

Seven archaeological sites are recommended eligible for listing on the National Register of Historic Places (NRHP), which include four prehistoric scatters. Fourteen prehistoric scatters remain unevaluated. The remaining 78 sites are recommended not eligible for listing on the NRHP (Kautz 2009).

3.3.2 Environmental Consequence

3.3.2.1 Proposed Action

All surface disturbing activities associated with the proposed projects would avoid the recommended eligible and unevaluated cultural resources. A buffer of approximately 30 to 50 meters would be established around eligible and unevaluated cultural sites that lie very close to project activities. When initial construction is close to the buffered areas, an archaeological monitor would be present to insure that eligible and unevaluated cultural sites are not disturbed (see Section 2.1.11). As such, the proposed Project would have no impact on any archaeological sites that are either unevaluated or recommended eligible for nomination to the NRHP.

Regulations implementing the Archaeological Resources Protection Act (ARPA), codified at 43 CFR 7, as well as regulations implementing the Native American Graves Protection and Repatriation Act (NAGPRA), codified at 43 CFR 10, both provide protection for historic properties, cultural resources, and Native American funerary items and/or physical remains located on federal land. In addition, ARPA provides for the assessment of criminal and/or civil penalties for damaging cultural resources. To ensure compliance with the ARPA and NAGPRA, the following mitigation measure is proposed:

Mitigation Measure

Any unplanned discovery of cultural resources, human remains, items of cultural patrimony, sacred objects, or funerary items, requires that all activity in the vicinity of the find ceases, and notification be made to Doug Furtado, Field Manager, Mt. Lewis Field Office, 50 Bastian Way, Battle Mountain, NV, 89820 (775–635–4000), by telephone, with written confirmation to follow, immediately upon such discovery. The location of the find should not be publicly disclosed and any human remains must be secured and preserved in place until a Notice to Proceed is issued by the authorized officer.

3.3.2.2 Alternative 1

As with the Proposed Action, surface disturbing activities associated with Alternative 1 would avoid the recommended eligible and unevaluated cultural resources. The impacts to cultural

resources of Alternative 1 would be the same as for the Proposed Action. Mitigation proposed under the Proposed Action would be equally applicable to Alternative 1.

3.4 NATIVE AMERICAN RELIGIOUS CONCERNS

3.4.1 Affected Environment

Located within the traditional territory of the Western Shoshone (and possibly some Paiute) Tribes, the BLM MLFO administrative boundary contains spiritual/traditional/cultural resources, sites, and social practices that aid in maintaining and strengthening social, cultural, and spiritual integrity. Recognized tribes with known interests within the BLM MLFO administrative boundary are the Te-Moak Tribe of Western Shoshone (Elko, South Fork, Wells, and Battle Mountain Bands), Duck Valley Sho-Pai Tribes of Idaho and Nevada, Duckwater Shoshone Tribe, Ely Shoshone Tribe, Yomba Shoshone, the Timbisha Shoshone Tribe, and various other Tribal groups, community members, and individuals.

Though archaeological data and theory states that the Western Shoshone (Newe) began to inhabit the Great Basin area around 600 years ago, contemporary Western Shoshone contend they were here since “time immemorial.” Social activities that define the culture took place across the Great Basin. Pine nut gathering, edible and medical plant gathering, hunting and fishing, spiritual/ceremonial practices, and trade occurred as the Great Basin peoples practiced a mobile hunting and gathering lifestyle. As with the delicate and sensitive nature of the fragile resources of the Great Basin, the native cultures appeared to be heavily impacted by social, cultural, and environmental change, which rapidly accompanied the non-native migration from east to west. Confined to reservations and “encouraged” to participate in a more sedentary lifestyle (farming and cattle ranching), the Western Shoshone and other Great Basin tribes continued to practice certain cultural/spiritual/traditional activities, visited their sacred sites, and hunted and gathered the available game and medicinal/edible plants. Through oral history, the practice of handing down knowledge from the elders to the younger generations, many Western Shoshone continue to maintain a world view not unlike that of their ancestors.

Such sites of importance include, but are not limited to: existing antelope traps; certain mountain tops used for prayer; medicinal and edible plant gathering locations; prehistoric and historic village sites and gravesites; sites associated with creation stories; hot and cold springs; material used for basketry and cradle board making; locations of stone tools such as points and grinding stones (mono and metate); chert and obsidian quarries; hunting sites; sweat lodge locations; locations of consistent pine nut harvesting, family gathering, and camping; boulders used for offerings and medicine gathering; tribally identified Traditional Cultural Properties (TCP’s); TCP’s found eligible to the National Register of Historic Places; rock shelters; “rock art” locations; lands that are near, within, or bordering current reservation boundaries; lands included in tribal land acquisition efforts that involve the Nevada Congressional Delegation, water sources in general, which are considered the “life blood of the Earth and all who dwell upon it.”

Specifically, the cultural resources inventory of the Jersey Valley Unit Area, Buffalo Valley Unit Area and transmission line corridor identified ninety-nine archaeological sites (seven of which

were previously recorded), including both historic and prehistoric resources. Of these, seven have been recommended by Kautz as eligible for inclusion on the National Register of Historic Places (NRHP), and fourteen sites remain unevaluated due to their location in coppice dunes, with the potential to contain intact, stratified cultural deposits (Kautz 2009) (see also Section 3.3).

In accordance with the National Historic Preservation Act (P.L. 89-665), the National Environmental Policy Act (P.L. 91-190), the Federal Land Policy and Management Act (P. L.94-579), the American Indian Religious Freedom Act (P.L. 95-341), the Native American Graves Protection and Repatriation Act (P.L. 101-601) and Executive Order 13007, the BLM must also provide affected tribes an opportunity to comment and consult on the proposed Project. BLM must attempt to limit, reduce, or possibly eliminate any negative impacts to Native American traditional/cultural/ sites, activities, and resources.

The BLM initiated consultation with the following Tribes: Battle Mountain Band Council, Te-Moak Tribe of Western Shoshone, Yomba Shoshone Tribe and the Duckwater Shoshone Tribe. To date, the Battle Mountain Band has primarily been the most active and participating tribal entity with a field visit having been conducted on June 4, 2009. Recent communications with tribal leadership has resulted in another field tour request by the Battle Mountain Band Chairman. Arrangements are forthcoming.

3.4.2 Environmental Consequences

3.4.2.1 Proposed Action

Concerns and discussion topics raised to date include impacts to identified cultural resources within the proposed Project Areas, and also impacts to hot springs.

- BLM law enforcement monitoring significant sites especially Jersey Valley hot springs;
- Eliminating impacts to wildlife during heavy construction periods especially near water sources and allowing access to water sources up the canyons above the Project Area;
- Responsibility for road maintenance and improvement;
- Tribal monitor/observer opportunities during transmission line, facility and pipeline construction and any planned or inadvertent data recovery efforts;
- Maintaining existing access routes (trails and roads) and not increasing access to formerly inaccessible locations;
- Ensuring no drawdown of hot and cold spring sources and preventing any continued degradation of local springs; and
- Undeniable impacts to cold and hot water sources as a result of previous mining and geothermal projects throughout Nevada.

Adopted environmental protection measures and mitigations proposed to address these concerns include avoidance of all eligible and unevaluated cultural resource sites and implementation of a hydrologic monitoring plan which would (see Sections 2.1.11, 3.9.2, and 3.3.2). Additionally,

geothermal lease stipulations (see Appendix A), direct that adverse impacts to springs are not allowed.

Vehicles, equipment, and personnel used for planning, exploration, construction and maintenance purposes can have negative impacts to areas utilized by native peoples and associated artifacts as identified in Section 3.3. Long and short term noise and visual impacts can have a detrimental impact to existing cultural/traditional/spiritual activities that may occur in certain areas. As consistently stated during previous communications, sacred sites such as prayer, sweat lodge, medicinal/strength gathering, and edible/medicinal plant gathering locations must remain quiet and undisturbed and a sense of reverence maintained.

The physical remains of past cultural and subsistence practices and activities (antelope traps, points, flakes, stone tools, grinding stones, etc…) are also considered to be extremely important and sacred due to such artifacts having been made by the ancestors and considered the evidence of thousands of years of native inhabitance. Archaeological sites within or in close proximity to certain project boundaries have been known to experience various levels of degradation, thus eliminating not only the physical evidence of native occupation, but also archaeological data, which can produce a better understanding of past and present cultures. Archaeological data along with native oral history can reveal information pertaining to past cultural activities and associated social practices, trade routes, subsistence activities, environmental changes, etc.

Roads leading to project activities, can experience further use by members of the public to access formerly inaccessible locations. If members of the general public increasingly utilize Project roads, the cultural/traditional/spiritual integrity of any adjacent Native use site may be compromised.

Also, the act of drilling wells (regardless of the data being sought) is often viewed by traditional practitioners and believers as being harmful to “mother earth” due to impacts to underground and surface waters, which are considered the “life blood of the Earth and all who dwell upon it.” Other than consumption by people, wildlife, and plant species, certain hot and cold spring locations are also used for healing and spiritual purposes. For this specific Project to date, contemporary traditional/cultural uses have not been identified within or near the Project boundaries. However, continued consultation may reveal otherwise.

During the Project activities, if any cultural properties, items, or artifacts (stone tools, Projectile points, etc…) are encountered, it must be stressed to those involved in the proposed Project activities that such items are not to be collected. Cultural and Archaeological resources are protected under the Archaeological Resources Protection Act (16 U.S.C 470ii) and the Federal Land Management Policy Act (43 U.S.C. 1701). The above language is applicable to previously identified artifacts and site locations, surface artifacts possibly missed during the original survey, and any subsurface artifacts (below ground).

Though the possibility of disturbing Native American gravesites within most Project areas is extremely low, inadvertent discovery procedures must be noted. Under the Native American Graves Protection and Repatriation Act, section (3)(d)(1), it states that the discovering individual

must notify the land manager in writing of such a discovery. If the discovery occurs in connection with an authorized use, the activity, which caused the discovery, is to cease and the materials are to be protected until the land manager can respond to the situation.

If any traditional cultural properties or artifacts are identified before or during development activities, a protective "buffer zone" may be acceptable, where physical avoidance is an issue, and if doing so satisfies the needs of the BLM, the proponent, and affected Tribe. The size of any "buffer zone" would be determined through coordination and communication between all participating entities. All NRHP-eligible and unevaluated cultural sites that were identified during the cultural resources inventory would be avoided.

3.4.2.2 Alternative 1

The impacts to Native American Religious Concerns from the construction, operation, maintenance and reclamation of Alternative 1 would be the same as those described for the Proposed Action.

3.5 WILDLIFE (INCLUDING THREATENED AND ENDANGERED SPECIES, SPECIAL STATUS SPECIES AND MIGRATORY BIRDS)

3.5.1 Affected Environment

A biological survey of portions of the Jersey Valley Unit Area, portions of the Buffalo Valley Unit Area and the entire transmission line corridor was conducted by Great Basin Ecology in May 2008 (GBE 2008). Subsequent to the May 2008 biological survey, additional areas of proposed surface disturbing activities were identified at the transmission line substation area. A survey of this area was conducted on April 22, 2009.

Similar wildlife species are likely to be found within the Jersey Valley Unit Area, Buffalo Valley Unit Area and transmission line corridor. These species include a variety of small mammals, raptors, reptiles and insects and are identified and described below.

Common mammalian species include the black-tailed jackrabbit (*Lepus californicus*), kangaroo rats (*Dipodomys sp.*), coyote (*Canus latrans*), badger (*Taxidea taxus*), and a variety of other small mammals (i.e. mice, voles, ground squirrels, etc) (GBE 2008).

Neither the Jersey Valley Unit Area nor the Buffalo Valley Unit Area have any known raptor nests nor provide suitable nesting habitat. One previously active prairie falcon nest and one previously active burrowing owl nest exist within 1 mile of the proposed transmission corridor and will be addressed further in the Special Status Species Section. No other known raptor nests or suitable habitat exists within the transmission corridor.

Foraging habitat for raptors such as golden eagle (*Aquila chrysaetos*), red-tailed hawk (*Buteo jamaicensis*), common raven (*Corvus corax*), prairie falcon (*Falco mexicanus*), ferruginous hawk

(*Buteo regalis*), and northern harrier (*Circus cyaneus*) may be found within the Jersey Valley Unit Area, Buffalo Valley Unit Area, and along the transmission line corridor.

A variety of reptiles have the potential to occur within the Jersey Valley Unit Area, Buffalo Valley Unit Area and transmission line corridor. Such species include the western whiptail lizard (*Cnemidophorus tigris*), leopard lizard (*Gambemia wislizenii*) and western fence lizard (*Sceloporus occidentalis*). The Great Basin rattlesnake (*Crotalus atrox*) is likely to occur in the broken rocks and brush habitats on the east side of the Jersey Valley Unit Area.

The BLM identified mule deer (*Odocoileus hemionus),* bighorn sheep (*Ovis canadensis nelsoni*) and pronghorn antelope (*Antilocapra americana*) habitat as potentially occurring within portions of either the Jersey Valley Unit Area, the Buffalo Valley Unit Area and/or the transmission line corridor, as described below.

Mule deer

Mule deer move between various zones from the forest edges at higher elevations to the desert floor, depending on the season. While the mule deer occupies almost all types of habitat within its range, it seems to prefer arid, open areas and rocky hillsides. Seasonal movements involving migrations from higher elevations (summer ranges) to lower winter ranges are associated, in part, with decreasing temperatures, severe snowstorms, and snow depths that reduce mobility and food supply. Mule deer in the arid southwest may migrate in response to rainfall patterns (Stamm 2006).

Mule deer crucial winter, summer or year round habitat has not been identified in either Unit Area or the transmission line corridor (NDOW 2005b, NDOW 2005c and NDOW 2005e). Mule deer winter habitat was identified in only the easternmost portion of the Jersey Valley Unit Area (NDOW 2005d).

Bighorn sheep

Bighorn sheep inhabit alpine meadows, grassy mountain slopes and foothill country near rugged, rocky cliffs and bluffs, allowing for quick escape. In winter, Bighorn sheep prefer slopes 2,500-5,000 feet where annual snowfall is less than 60 inches a year, because they cannot paw through deep snow to feed. Their summer range is between 6,000-8,500 feet in elevation (Stamm 2006).

There are no bighorn sheep migration corridors within either Unit Area or the transmission line corridor (NDOW 2005a). The eastern half of the Jersey Valley Unit Area, the southeastern corner of the Buffalo Valley Unit Area and the central and northern portions of the transmission line corridor have been mapped as bighorn sheep distribution habitat (NDOW 2005a).

Pronghorn antelope

Pronghorn antelope inhabit the grasslands, brushlands, bunch-grass and sagebrush areas of open plains and deserts (Stamm 2006).

The westernmost portion of the Jersey Valley Unit Area and the southern half of the transmission line corridor have been mapped as potential Pronghorn antelope habitat (NDOW 2007). The entirety of the Buffalo Valley Unit Area and the northern half of the transmission line corridor have been mapped as year-round Pronghorn antelope habitat (NDOW 2007).

Threatened and Endangered Species

Section 7(c) of the Endangered Species Act (ESA) of 1973, as amended, requires federal agencies to consult with the U.S. Fish and Wildlife Service (USFWS) concerning species listed under the ESA. Consistent with this requirement, a letter requesting information regarding threatened and endangered species which may occur within the Unit Areas and the transmission line corridor was sent to the USFWS on August 11, 2008.

The USFWS responded in a letter dated September 12, 2008 that, to the best of their knowledge, no listed or proposed species exist in the subject area (USFWS 2008).

In February 2008, the Nevada Natural Heritage Program (NNHP) provided a Sensitive Taxa Record Search for endangered, threatened, candidate and/or at risk plant and animal taxa recorded within or near the Jersey Valley Unit Area, Buffalo Valley Unit Area and the proposed transmission line corridor (NNHP 2008a and 2008b). No threatened or endangered species were identified.

Special Status Species

The USFWS expressed concern that the proposed Project activities could potentially impact the greater sage grouse (*Centrocercus urophasianus*) and the pygmy rabbit (*Brachylagus idahoensis*).

The NNHP identified (either within the proposed Project areas or a 5 km buffer around the subject lands): Lahontan beardtongue (*Penstemon palmeri* var. *macranthus*), windloving buckwheat (E*riogonum anemophilum*) and Reese River phacelia (*Phacelia glaberrima*). Habitat may also be available for the Sadas pyrg (*Pyrgulopsis sadai*) and the Dixie Valley pyrg (*Pyrgulopsis dixensis*) (NNHP 2008a and 2008b).

Additionally, the BLM MLFO requested surveys for burrowing owls and bats, and identified the ferruginous hawk (*Buteo regalis)*, prairie falcon (*Falco mexicanus)* and golden eagle (*Aquila chrysaetos)* as potentially within or adjacent to the proposed Project Areas.

Greater Sage-Grouse

Greater sage-grouse use sagebrush habitats with significant grass and forb components. Breeding habitat consists of habitat suitable for leks, nesting, and early brood-rearing areas. Suitable nesting and early brood rearing habitats are dominated by sagebrush with a healthy herbaceous understory. From late June to early November, sage-grouse will use a variety of moist and mesic habitats where succulent forbs are found. These habitats include riparian areas, wet meadows,

lakebeds, farmlands, uplands including sagebrush and recently burned areas. During the winter months sage-grouse feed almost exclusively on sagebrush. Sagebrush stands with canopy covers of 10-30% and winter cover heights of at least 25 centimeters above the snow is needed. Topographic relief and a diversity of sagebrush heights in an area are important (Stamm 2006).

All of the seasonal habitats for sage-grouse were either lacking within the surveyed portions of the Jersey Valley Unit Area or were only present in marginal condition. No extensive stands of sagebrush were present and no signs of sage-grouse were observed (GBE 2008).

The sagebrush within the valley floor of the Buffalo Valley Unit Area and transmission line corridor may occasionally serve as sage-grouse winter habitat for birds that normally spend the entire year in the Fish Creek Mountains or in the Tobin Range. In rare years when snow accumulation in these mountain areas is sufficiently deep to cover the sagebrush, sage-grouse may use the valley floor sagebrush (GBE 2008). Although some potential movement between the Fish Creek Mountains and the Tobin Range exists, data suggests this movement is seldom and unlikely. Based on radio telemetry data gathered from 2003-04 in the Fish Creek Mountains, sage-grouse in the Fish Creeks appear to be non-migratory, spending the entirety of the year in that range. In addition, no locations of individuals were recorded within 2 miles of any portion of the Project vicinity. Also, Great Basin Ecology did not observe any sage-grouse sign within either the Buffalo Valley Unit Are or the transmission line corridor during their 2008 survey.

Pygmy Rabbit

Pygmy rabbits are North America's smallest rabbits, and the only rabbits that commonly construct their own burrows, usually in stands of tall, dense sagebrush in locations with deep, loose soils. Pygmy rabbits are patchily distributed throughout most of the Great Basin. Though locally common, these animals have apparently never been generally abundant during historical times, and may have undergone serious population declines, habitat and population fragmentation, and local extinction in recent decades. Pygmy rabbits are sagebrush obligates and their decline is probably closely related to loss and degradation of sagebrush habitats (Stamm 2006).

Pygmy habitat was marginal within the surveyed portions of the Jersey Valley Unit Area and neither pygmy rabbits nor their sign (i.e. burrows, droppings, etc.) were observed (GBE 2008). The sagebrush was not extensive in most of the surveyed portions of the Buffalo Valley Unit Area. The salt desert shrub and soils were not suitable habitat and no pygmy rabbits or their sign were observed during the field survey (GBE 2008). The sagebrush associated with some of the drainages crossed by the transmission line corridor appeared to be suitable habitat for the pygmy rabbit. These drainages were extensively surveyed and no pygmy rabbits or their sign were observed during the field survey (GBE 2008).

Lahontan beardtongue

Lahontan beardtongue is a tall perennial herb with wand-like stems and showy pink tubular flowers with darker markings. It is typically found along washes, roadsides and canyon floors,

particularly on carbonate-containing substrates, usually where subsurface moisture is available throughout most of the summer (NNHP 2001c). It is found at elevations between 3,400 and 4,550 feet amsl.

Given the elevation and soils within the Jersey Valley Unit Area, suitable habitat could exist. However, the only water sources available throughout the summer were the hot springs and the associated soils are not suitable for this species. No Lahontan beardtongue was observed during the survey period within the Jersey Valley Unit Area (GBE 2008). Within the Buffalo Valley Unit Area, the only areas having subsurface water into the summer were the areas associated with the hot springs. These areas, however, receive high levels of livestock use. No Lahontan beardtongue populations were observed (GBE 2008). Within the transmission line corridor, neither Lahontan beardtongue populations nor suitable habitat were observed (GBE 2008).

Windloving buckwheat

At high elevations the Windloving buckwheat is found on dry, exposed, relatively barren and undisturbed, gravelly, limestone or volcanic ridges and ridgeline knolls, on outcrops or shallow rocky soils over bedrock, with *Artemisia arbuscula, Ericameria viscidiflora*, *Poa secunda, Elymus elymoides, Arenaria kingii*, etc. At low elevations the Windloving buckwheat is found on dry, relatively barren and undisturbed knolls and slopes of light-colored, platy volcanic tuff weathered to form stiff clay soils, on all aspects, with *Tetradymia canescens, Ericameria nauseosa, E. viscidiflora, Atriplex confertifolia, Elymus elymoides, Elymus cinereus, Astragalus calycosus*, etc (NNHP 2001a).

Suitable habitat may be present within the surveyed portions of the Jersey Valley Unit Area, however no individuals were observed during the field survey (GBE 2008). Habitat may also be present within the Buffalo Valley Unit Area and along portions of the transmission line corridor, however the season long grazing on this area has reduced the plant diversity over time and this species was not observed during the field survey (GBE 2008).

Reese River Phacelia

Reese River Phacelia habitat is open, dry to moist, alkaline, nearly barren, sometimes scree covered, whitish to brownish shrink-sell clay soils derived from fluviolacustrine volcanic ash and tuff deposits, generally on the steeper slopes of low hills, bluffs, and badlands in the shadscale-greasewood, sagebrush, and lower pinyon-juniper zones with *Atriplex confertifolia, A. canescens, Artemisia tridentate, Sarcobatus vermiculatus, tetradymia, Phacelia gymnoclada, Cleomella*, etc (NNHP 2001b).

Suitable habitat may be present within the surveyed portions of the Jersey Valley Unit Area, however no species were observed during the field survey (GBE 2008). Suitable habitat exists within the Buffalo Valley Unit Area, however, livestock use has been year-long for many years and the chances of this plant being present are low. No Reese River Phacelia populations were observed during the field survey (GBE 2008). No Reese River Phacelia populations were observed along the transmission line corridor (GBE 2008).

Sadas pyrg and Dixie Valley pyrg

The Sadas pyrg (*Pyrgulopsis sadai*) and Dixie Valley pyrg (*P. dixensis*) are both springsnails associated with freshwater seeps and springs. While the springs occupied by springsnails vary in their water quality and quantity, generally speaking, the springs need to be perennial, have moderate to high flows, cool temperatures, and good water quality. Springs that have been developed or heavily impacted by livestock, wild horses, or wildlife, are not as likely to have springsnails as springs with good water quality and riparian vegetation (GBE 2008).

The perennial water sources within the Jersey Valley Unit Area consisted of two springs, neither possesses cool water and flows were very low. Additionally, both springs were impacted by wild horses and livestock and did not appear to be suitable habitat for springsnails. No springsnails were observed within either spring (GBE 2008). The perennial water sources within the Buffalo Valley Unit Area consisted of the spring complex known as the Buffalo Valley Hot Springs. None of the springs in this complex had cool water; the water temperature was "hot" to the touch during the field surveys. These springs did not appear suitable habitat for the springsnails. No springsnails were observed within the spring areas (GBE 2008). No perennial waters occurred along the transmission line corridor, and therefore, no suitable habitat for the springsnails existed (GBE 2008).

Western burrowing owl

Western burrowing owls inhabit open terrain and typically create a nest by occupying an abandoned burrow created by other animals such as a badger (*Taxidea taxus*). They are also found in roadside berms (Stamm 2006).

Burrowing owl habitat is marginal within the surveyed portions of the Jersey Valley Unit Area. One historically active burrowing owl nest exists within 1 mile of the proposed transmission corridor thus surveys were completed specific to this species. Numerous burrows were observed during GBE's 2008 survey, but no sign of burrowing owl activity was observed. The survey was conducted during the nesting season and it is likely owls would have been observed if present (GBE 2008). Within the Buffalo Valley Unit Area, the vegetation in the northeastern and eastern portion of the area appeared suitable for burrowing owls. These areas were not seasonally saturated and sufficient burrows were present for nesting sites. However, none of the burrows observed showed any signs of burrowing owl activity (GBE 2008). The areas north and east of the Buffalo Valley Unit Area (within the transmission line corridor) appeared suitable for burrowing owls. The more extensive sagebrush stands were evidence that these areas were not seasonally saturated. None of the burrows observed showed any signs of burrowing owl activity and no burrowing owls were observed during the field survey (GBE 2008).

Townsend's big-eared bat and pallid bat

Townsend's big-eared bat (*Corynorhinus townsendii*) is associated with areas containing caves and cave analogs for roosting habitat. Townsend's big-eared bat requires spacious cavern-like structures for roosting during all stages of its lifecycle (Pierson et al. 1999).

The pallid bat (*Antrozous pallidus*) breeds in arid deserts and grasslands, often near rocky outcrops and water. It is present but less abundant in evergreen and mixed conifer woodland. The bat will usually roost in a rock crevice or building, and less often in a cave, tree hollow, or mine.

There is a major bat maternity colony and hibernaculum located within Sections 27 and 34, T.27N., R.40E. of the Jersey Valley Unit Area. The spring areas and associated vegetation provide for foraging habitat. The desert shrub and sagebrush vegetation communities also provide foraging habitat for the Townsend's big-eared bat and the pallid bat (GBE 2008).

The Buffalo Valley Unit Area is within five or six miles of known roosting habitat for the Townsend's big-eared bat and the pallid bat in the Battle Mountain Range, near the Phoenix Mine. The valley floor is likely foraging habitat for these bat species. However, no suitable roosting habitat occurs within the Buffalo Valley Unit Area (GBE 2008).

The transmission line corridor is located in potential foraging habitat for the Townsend's big-eared bat and the pallid bat in the Battle Mountain Range, near the Phoenix Mine. However, no suitable roosting habitat occurs along the transmission line corridor (GBE 2008).

Ferruginous hawk

The ferruginous hawk is a nesting-summer resident of the planning area. A number of nests have been recorded over the years. Juniper trees are the preferred nesting sites of the ferruginous hawk, and nests are often constructed in juniper "stringers" which overlook large open areas on alluvial fans. Prey consists primarily of ground squirrels in the spring and early summer and jackrabbits in late summer and fall. Ferruginous hawks are more sensitive to nest disturbance than most raptors (Stamm 2006). An active ferruginous hawk nest was found within the transmission corridor in April 2009. Suitable foraging habitat for ferruginous hawks exists throughout the Project vicinity.

Prairie falcon

The Prairie Falcon has a body length of 15 – 20 inches, a 3½ foot wingspan, and weighs 1 – 2 pounds. Prairie Falcons inhabit hills, canyons, and mountains of arid grasslands and shrub-steppes of southwestern Canada, western United States, Baja California, and northern Mexico. An active prairie falcon nest was identified in 2000 within 1 mile of the proposed transmission corridor. Suitable foraging habitat for prairie falcon exist throughout the Project vicinity.

Golden eagle

The golden eagle is Nevada's largest resident bird of prey, sometimes weighing over twelve pounds and having a wingspan that may exceed seven feet. This bird is highly adaptable, has world-wide distribution and is a common year-long resident of the planning area. Golden eagles feed primarily on small mammals-jackrabbits, cottontails, and ground squirrels-though they are capable of taking larger prey (Stamm 2006). There have been many sightings of golden eagle in the Project vicinity, though there are no known nests nearby.

Migratory Birds

Migratory birds may be found in the proposed Project area as either seasonal residents or as migrants. Provisions of the Migratory Bird Treaty Act (16 USC 701-718h) prohibit the killing of any migratory birds, including the taking of any nest or egg, without a permit. Executive Order 13186, titled "Responsibilities of Federal Agencies to Protect Migratory Birds," was signed on October 1, 2001 to further enhance and ensure the protection of migratory birds. Migratory bird species utilize almost all of the Shoshone-Eureka Planning Area during some time of the year.

Bird species include meadowlarks (*Sturnella meglectus*), horned larks (*Eremophilia alpestris*), mourning doves (*Zenaidura macroura*), and barn swallows (*Hirunda rustica*). Red-winged blackbirds (*Agelaius phoeniceus*) and killdeer (*Charadrius vociferous*) were observed near the two spring areas within the Jersey Valley Unit Area. House finches (*Carpodacus mexicanus*) were observed and heard along the eastern Jersey Valley Unit Area boundary near the pinyon-juniper woodlands on the hill slopes. Black-throated sparrow (*Amphispiza bileneata*) and loggerhead shrike (*Lanius ludovicianus*) were also observed within the Buffalo Valley Unit Area.

3.5.2 Environmental Consequences

3.5.2.1 Proposed Action

Surface disturbance associated with construction activities would result in the loss of wildlife habitat. The direct displacement of wildlife would result from the surface disturbance required for construction of the drilling pads, power plant site, pipelines, transmission line, switching station and access roads. A slight reduction in wildlife carrying capacity would be expected to occur for some species, but most wildlife would be expected to adjust and relocate to similar habitat that is abundant in the Project vicinity.

The transmission line poles would provide perching sites for raptors. The approximately 27.59-mile-long transmission line would also increase the potential for bird collisions, electrocution and bird mortality. However, Ormat has agreed to adopt transmission line raptor protection practices which would minimize bird electrocutions with the transmission line and reduce bird mortality. Additionally, to prevent perching, (a cone, Kaddas Enterprises type KE1058 or equal) would be installed on the top of each transmission line pole along the entirety of the transmission line (see Figure 15, Figure 16 and Section 2.1.11).

Project-generated noise could also keep some animals away from areas directly affected by surface disturbance during the construction, drilling and power plant operations. Other indirect effects could result from general human activity, which could displace individuals or reduce breeding success of species that are sensitive to human activity. The indirect effects would be temporary and short-term for the proposed construction and drilling operations, but would continue over the life of the Project for power plant operations. Wildlife would be able to

re-occupy the disturbed areas upon completion of the Project and site reclamation. There should be no residual impacts to wildlife resources.

Threatened and Endangered Species

There would be no impacts to threatened and endangered species as none are known to exist within the surveyed portions of the Jersey Valley Unit Area, Buffalo Valley Unit Area and proposed transmission line corridor.

Special Status Species

Sage-Grouse

No impacts to sage-grouse are expected within the Jersey Valley Unit Area as sage-grouse habitat is marginal and no sage-grouse were observed during the biological survey. Within the Buffalo Valley Unit Area and the transmission line corridor, sage-grouse may use the sagebrush in the valley floor as winter habitat on the rare occasions when the snow accumulation in the Fish Creek Mountains or the Tobin Range is sufficiently deep to cover the sagebrush. To reduce the potential impacts to wintering concentrations of sage-grouse, Ormat has committed to adopt protection measures which would reduce potential impacts to sage-grouse (see Section 2.1.11).

Pygmy Rabbit

No impacts to pygmy rabbits are expected within the Jersey Valley Unit Area and Buffalo Valley Unit Area as pygmy rabbit habitat is marginal and no pygmy rabbits were observed during the biological survey. As some of the sagebrush associated with a few of the drainages crossed by the transmission line corridor were suitable habitat for pygmy rabbits, potential impacts to pygmy rabbits exist during construction of the transmission line. However, transmission line poles could be located outside of, and "span," the existing drainages. As no surface disturbing activities associated with construction of the transmission line are proposed within any pygmy rabbit habitat, direct impacts to pygmy rabbits are minimal.

The additional traffic resulting from the construction crew traffic will increase the amount of dust in the area and will increase the probability of running over a pygmy rabbit. However, the rough roads will limit the speed of the vehicles. Ormat has also proposed to apply water to the ground during the construction and utilization of the drill pads and access roads as necessary to control dust (see Section 2.1.11). Therefore, the proposed Project(s) may impact individuals, but would not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species.

Lahontan Beardtongue

Given the marginal Lahontan Beardtongue habitat and the absence of this species observed in the surveyed portions of the Jersey Valley Unit Area, Buffalo Valley Unit Area and proposed

transmission line corridor, it is not likely that the proposed Project(s) would have an effect on this species.

Windloving buckwheat

No impacts to the Windloving buckwheat are expected within the Jersey Valley Unit Area, Buffalo Valley Unit Area and proposed transmission line corridor as habitat is marginal and no species were observed during the biological survey.

Reese River Phacelia

No impacts to the Reese River Phacelia are expected within the surveyed portions of the Jersey Valley Unit Area, Buffalo Valley Unit Area and proposed transmission line corridor as none were observed during the biological survey.

Sadas Pyrg and Dixie Valley Pyrg

No impacts to the Sadas Pyrg and Dixie Valley Pyrg are expected as none were found within the springs within the Jersey Valley Unit Area and Buffalo Valley Unit Area and suitable habitat is not known to exist. There is no suitable habitat for the spring snails within the transmission line corridor and no impacts are anticipated.

Western burrowing owl

As western burrowing owl habitat is marginal within the surveyed portions of the Jersey Valley Unit Area, and no burrowing owls were observed during the survey, activities conducted within the Jersey Valley Unit Area would not likely have an effect on the burrowing owl.

Portions of the Buffalo Valley Unit Area and the vegetation along the transmission line corridor north and east of the Buffalo Valley Unit Area appeared suitable for burrowing owls, though no owls were observed. The survey was conducted during the nesting season and it is likely owls would have been observed if present. A mitigation measure (see below in Migratory Birds section) has been recommended, which should reduce potential impacts to burrowing owls.

Townsend's big-eared bat and pallid bat

Potential impacts to bat roosting habitat are not anticipated. To avoid potential impacts to those bats which use the mine adits located in Sections 27 and 34, T27N, R40E, Federal Geothermal Lease NVN-77483 applies a "no surface occupancy" restriction to lands within 0.25 mile of these adits. No activities are proposed which would occur within 0.25 miles of these adits and no impacts are anticipated.

However, bats may forage within the riparian areas of the Jersey Valley Unit Area and Buffalo Valley Unit Area. As there are no surface disturbing activities proposed within any riparian area, there will be no direct impacts to riparian vegetation and there should be no impacts to bat

species. Additionally, geothermal lease stipulations (see Appendix A), direct that adverse impacts to springs are not allowed, therefore indirect impacts to the associated riparian vegetation are not anticipated. Mitigation requiring hydrologic monitoring has been recommended (see Section 3.9.2). Lights used for drilling at night and power plant operations may attract and concentrate moths and other insects on which the bats may feed, which could be a beneficial effect.

Ferruginous hawk, prairie falcon and golden eagle

Impacts to ferruginous hawks, prairie falcons, and golden eagles include potential electrocution through direct strikes to transmission lines when flying or when attempting to perch on transmission lines poles. To reduce potential impacts to raptors and deter raptors from the Project vicinity, Ormat has proposed an environmental protection measure (see Section 2.1.11).

An additional mitigation measure (see below in Migratory Birds section) has been recommended, which should reduce potential impacts to nesting birds.

Migratory Birds

Construction of the proposed Project(s) (regardless of the season constructed) would result in the direct loss of potential migratory bird habitat until reclaimed. Project construction is temporary and short-term. Migratory birds would adjust and relocate to abundant similar habitat in the vicinity and beyond.

Project-generated construction and drilling noise (estimated at an average 83 decibels (dBA) at a distance of 50 feet) could also keep some migratory birds away from areas generating this noise (typically areas of new surface disturbance). Other indirect effects could result from general human activity, which could displace individuals or reduce breeding success of species that are sensitive to human activity.

The indirect impacts would be temporary and short-term for the proposed construction and drilling operations, but would continue over the life of the Project(s) for power plant operations. Migratory birds would be able to re-occupy the disturbed areas upon completion of the Project(s) and site reclamation. There should be negligible residual impacts to migratory birds.

To avoid the potential for direct destruction of a nest during surface disturbing activities, the following mitigation is proposed.

Mitigation Measure:

Initial ground disturbing activities would not be conducted during the migratory bird nesting season (April 1-August 15) unless necessary, and then only after inventories for migratory birds and nests were conducted by a qualified biologist acceptable to the BLM. This survey would be conducted to identify either breeding adult birds or nest sites within the specific areas to be disturbed. If active nests are present within the areas to be

disturbed, Ormat would coordinate with the BLM or appropriate state officials, as applicable, to develop appropriate protection measures for the active nest sites, which may include avoidance, construction constraints, and/or the establishment of buffers.

Following the implementation of this mitigation measure, the potential impacts to migratory birds should be reduced.

3.5.2.2 Alternative 1

The construction, operation and maintenance of Alternative 1 would differ from the Proposed Action only by the small increase (0.25 acre) in the total permanent surface disturbance. The potential impacts to bats would be less given that the majority of the surface disturbance is located further away from the adits. Conversely, the positive benefit to bats (lights associated with project activities potentially attracting moths and other insects on which the bats may feed) is reduced as the Project components are further from the adits.

The mitigation measures recommended for the Proposed Action also would be equally applicable to Alternative 1.

3.6 INVASIVE, NONNATIVE SPECIES

3.6.1 Affected Environment

Noxious weeds and invasive species are typically nonnative plants that infest and/or invade areas of fresh soil/ground disturbance. Generally, on disturbed sites where noxious weed species have invaded the plant has the attributes to rapidly out-compete native vegetation for vital natural resources. Noxious weeds, invasive and nonnative species impact native ecosystems by reducing overall biodiversity, by altering local hydrologic and soil characteristics and can immediately increase fire intensity. On a smaller scale, noxious weeds interfere with native plant successional pathways by competing for pollinators, being prolific seed producers and inundating the surrounding soil with weed seed, displacing rare plant species, serving as reservoirs of plant pathogens and converting complex plant communities into simple plant communities.

Noxious weed, invasive and nonnative species seed or vegetative plant parts are carried, transported or deposited into and infest weed-free areas by people, equipment, livestock/wildlife or by abiotic means (wind, water).

As of 2009, the State of Nevada under Nevada Administrative Code 555.010 listed 47 species on the Nevada Noxious Weed List.

A noxious weed, invasive and nonnative species inventory was conducted during the biological survey within the Jersey and Buffalo Valley Unit Areas and the transmission line corridor. The biological survey conducted in 2008 (see Section 3.5) also included an inventory for noxious weeds, invasive and non-native species.

Two State of Nevada noxious weed species were observed within the Jersey Valley Unit Area. Hoary cress (*Cardaria draba*) was observed associated with the spring in Section 28. The patch was discontinuous and linear, infesting the wetted perimeter of the spring outflow. The entire area of infestation was less than one-half acre (GBE 2008). Saltcedar (*Tamarix ramosissima*) was observed in two locations in Section 28. There was a large single tree near the spring in Section 28. The spring outflow enters into an incised channel with scattered patches of young salt cedar saplings (GBE 2008). This channel extends outside of the survey boundary.

Within the Buffalo Valley Unit Area and along the transmission line corridor, no State of Nevada noxious weeds were observed however 3 species considered to be invasive or nonnative were observed; cheatgrass (*Bromus tectorum*), Russian thistle (*Salsola iberica*) and halogeton (*Halogeton glomeratus*) (GBE 2008).

Personnel from the Battle Mountain District-Mount Lewis Field Office (MLFO) have conducted noxious weed inventories throughout the Jersey and Buffalo Unit Areas and along the roadsides associated with the transmission line corridor. A search of the GIS (Graphic Information System) database indicates that within the Jersey Valley Unit Area tamarisk, a State of Nevada noxious weed, is present through many of the ephemeral washes draining Jersey Canyon, consistent with the GBE 2008 findings. In the past 2 years the MLFO has made an effort to control the tamarisk in these washes through chemical and mechanical control methods. Continued treatment of these infested washes is planned for subsequent years. The other State of Nevada noxious weed found within the Jersey Valley Unit Area is hoary cress. Hoary cress can be found growing along roadsides where disturbance is constant and wetted areas within the Jersey Valley Unit Areas. In addition to the invasive plants identified by GBE 2008 there are documented records of bull thistle and curly dock within the Jersey Valley Unit Area.

It should be noted that hoary cress and Russian knapweed (*Acroptilon repens*), another State of Nevada noxious weed, has been identified on private property where spring water may be obtained for the project, see Section 2.1.7 *Water Requirements and Source* pg. 24-25. of this document. Any proposed mitigation measures should also be followed when exiting these areas.

Within the Buffalo Valley Unit Area there is a documented infestation of perennial pepperweed (*Lepidum latifolium*) another State of Nevada noxious weed (29N 41E Sec. 25). In close proximity to the Buffalo Valley Unit Area are infestations of tamarisk, hoary cress, musk thistle and Russian knapweed.

In close proximity to the Buffalo Valley Unit Area and along sections of the transmission line corridor there are documented infestations of tamarisk, hoary cress, musk thistle and Russian knapweed have been identified.

3.6.2 Environmental Consequences

3.6.2.1 Proposed Action

The proposed Project could contribute to the spread of noxious weeds, invasive and nonnative species within the Jersey and Buffalo Valley Unit Areas and the transmission line corridor through the proposed surface disturbing activities and the number of construction and drilling vehicles involved.

Ormat has committed to follow the mitigation measures (see Section 2.1.11), "To prevent the spread of invasive, nonnative species, vehicles and equipment would be power washed, including body and undercarriage, prior to entering public lands managed by the BLM" and geothermal resources special lease stipulations found in Appendix A of this document (WFO & BMFO NVN-77483, WFO N-74883 & N-74881, N-74865, N-74868, N-74869). Following the implementation of these environmental protection measures, there would remain the potential for the spread of noxious weeds, invasive and nonnative species (seed and vegetative plant parts) within the Jersey Valley and Buffalo Unit Areas and along the transmission line corridor, which would be a residual impact. Ormat has also committed to re-vegetate disturbed areas using BLM approved weed-free seed mixes.

3.6.2.2 Alternative 1

Alternative 1 would differ from the Proposed Action in that there would be an increase (0.25 acres) in the total amount of permanent surface disturbance due to construction, operation and maintenance. The impacts of Alternative 1 from invasive, nonnative species would not be substantially different from that of the Proposed Action.

3.7 SOILS

3.7.1 Affected Environment

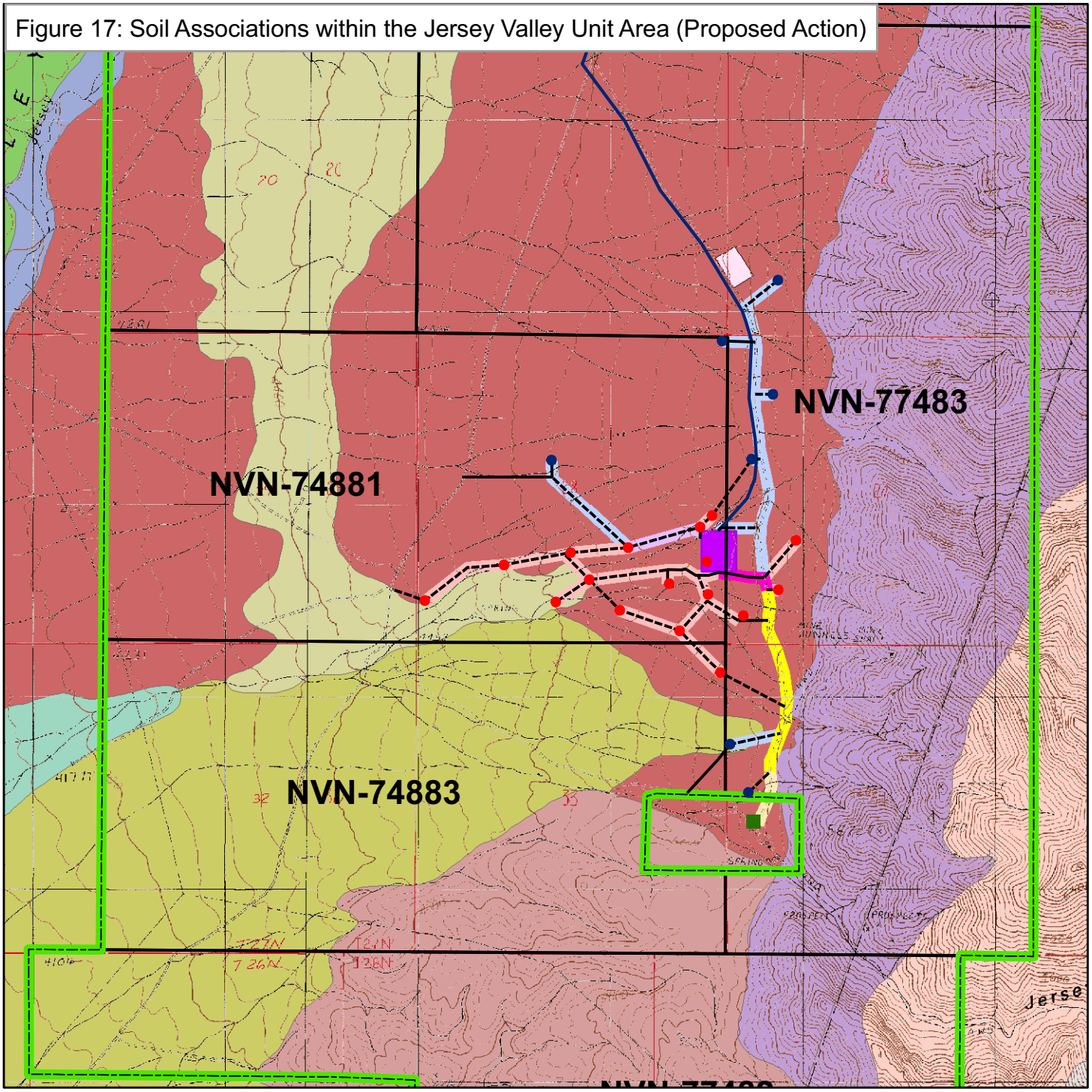
Soil associations in the Jersey Valley Unit Area, Buffalo Valley Unit Area and the transmission line corridor have been mapped by the USDA, Natural Resource Conservation Service (NRCS).

Soil associations within the Jersey Valley Unit Area are: 211, Preble variant-Whirlo; 662, Oxcorel-Whirlo-Trocken variant; 673, Misad-Golconda-Tenabo; 2711, Burrita-Burnborough; 2721, Burnborough-Sumine-Burrita; 2555, Laped-Colbar; 251, Whirlo-Beoska-Oxcorel; 652, Burrita-Hoot-Rock outcrop; 1340, Laped-Colbar; and 653, Buirrita-Burnborough (USDA, NRCS 2008a and 2008b) (see 17 and Figure 19).

Soil associations within the Buffalo Valley Unit Area are: 247, Bubus-Isolde; 1140, Wendane; 1145, Wendane-Playas, and 2066, Oxcorel-Broyles-Dun Glen; 740, Playas; 1169, Whirlo-Broyles; and 1570, Koynik variant-Oxcorel-Whirlo (USDA, NRCS 2008a) (see Figure 18).

Soil associations within the transmission line corridor are: 596, Trunk-Burrita; 661, Oxcorrel-Orovada; 670, Misap-Snapp-Oxcorel (USDA, NRCS 2008b); 240, Bubus; 245, Bubus-Needle Peak-Yipor; 701, Orovada; 835, Reese-Ocala; 1292, Kingingham-Golconda-Whirlo; and 2062,Oxcorel-Orovada (USDA, NRCS 2008a). Soil associations 247, 1169 and 2066 (USDA, NRCS 2008a) and soil associations 652 and 662 (USDA, NRCS 2008b) are within the transmission line corridor and have been stated above.

Figure 17: Soil Associations within the Jersey Valley Unit Area (Proposed Action)



LEGEND

Soil Association Symbol
- 1340
- 211
- 251
- 482
- 653
- 662
- 673
- 911
- Geothermal Lease Boundary
- Jersey Valley Geothermal Unit Area (NVN-83483X)
- Construction Water Source
- Existing Access Road
- Proposed Access Road
- 120 kV Power ROW - Proposed Action
- Proposed Power Plant Location
- Construction Water Pipeline
- Construction Water and Injection Pipelines
- Water, Injection, and Production Pipelines
- Injection Pipeline
- Injection and Production Pipelines
- Production Pipeline
- Currently Approved Gravel Source

United States Department of the Interior
Bureau of Land Management
Mount Lewis Field Office
50 Bastian Road
Battle Mountain, NV 89820

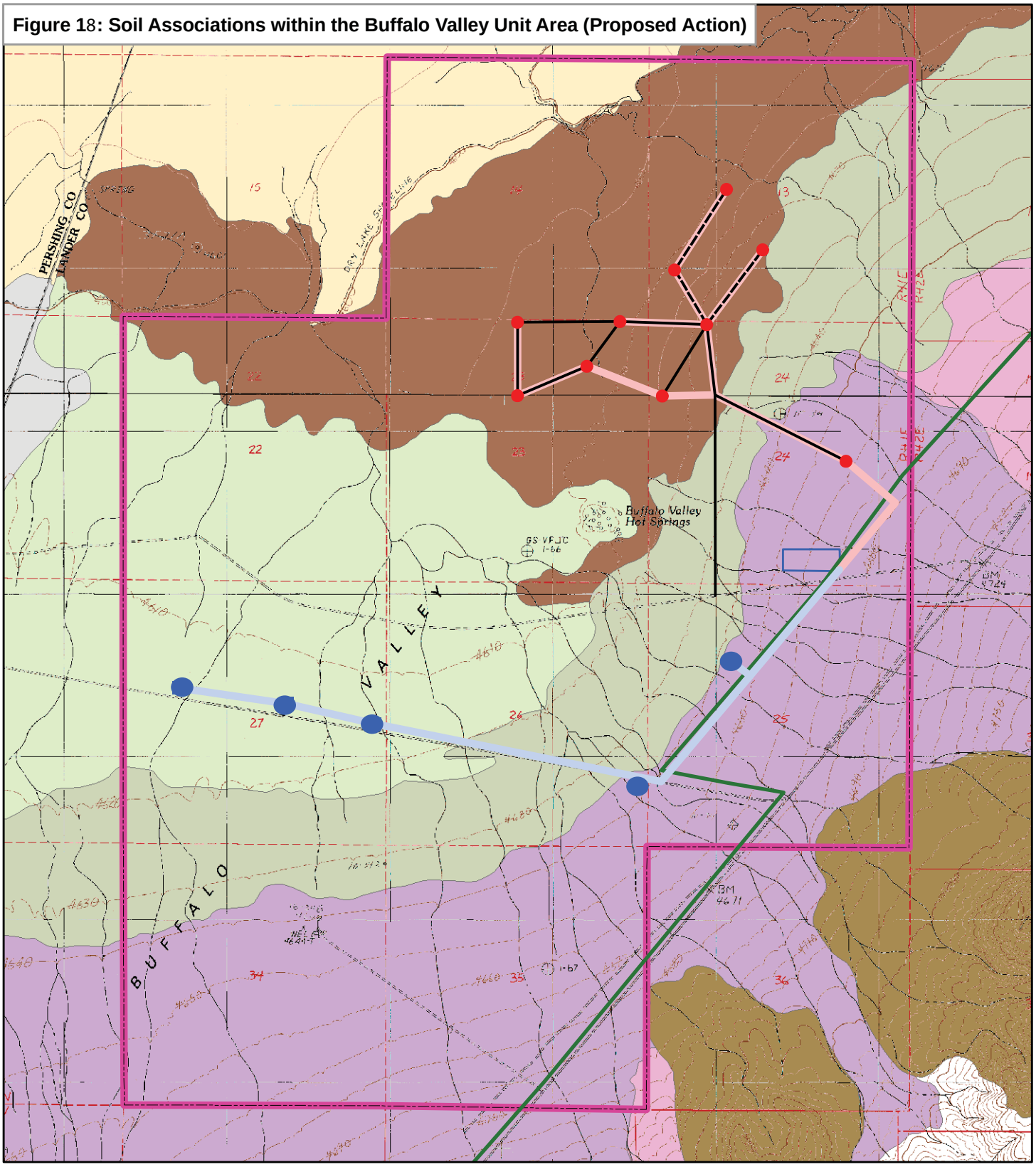
The data shown on the map uses the Universal Transmercator (Zone 11N) Coordinate system and uses the NAD83 projection.

Map Date: March 16, 2010

N W E S

0 0.5 1 2 Miles

Figure 18: Soil Associations within the Buffalo Valley Unit Area (Proposed Action)



LEGEND

- Injection Well
- Production Well
- Existing Access
- New Access
- Injection Pipeline
- Production Pipeline
- 120 kV Power ROW - Proposed
- Proposed Buffalo Valley Power Plant Location
- Buffalo Valley Geothermal Unit Area (NVN-838484X)

Soil Association Number

- 247
- 740
- 1140
- 1143
- 1145
- 1169
- 1570
- 2066

0 0.25 0.5 1 Miles

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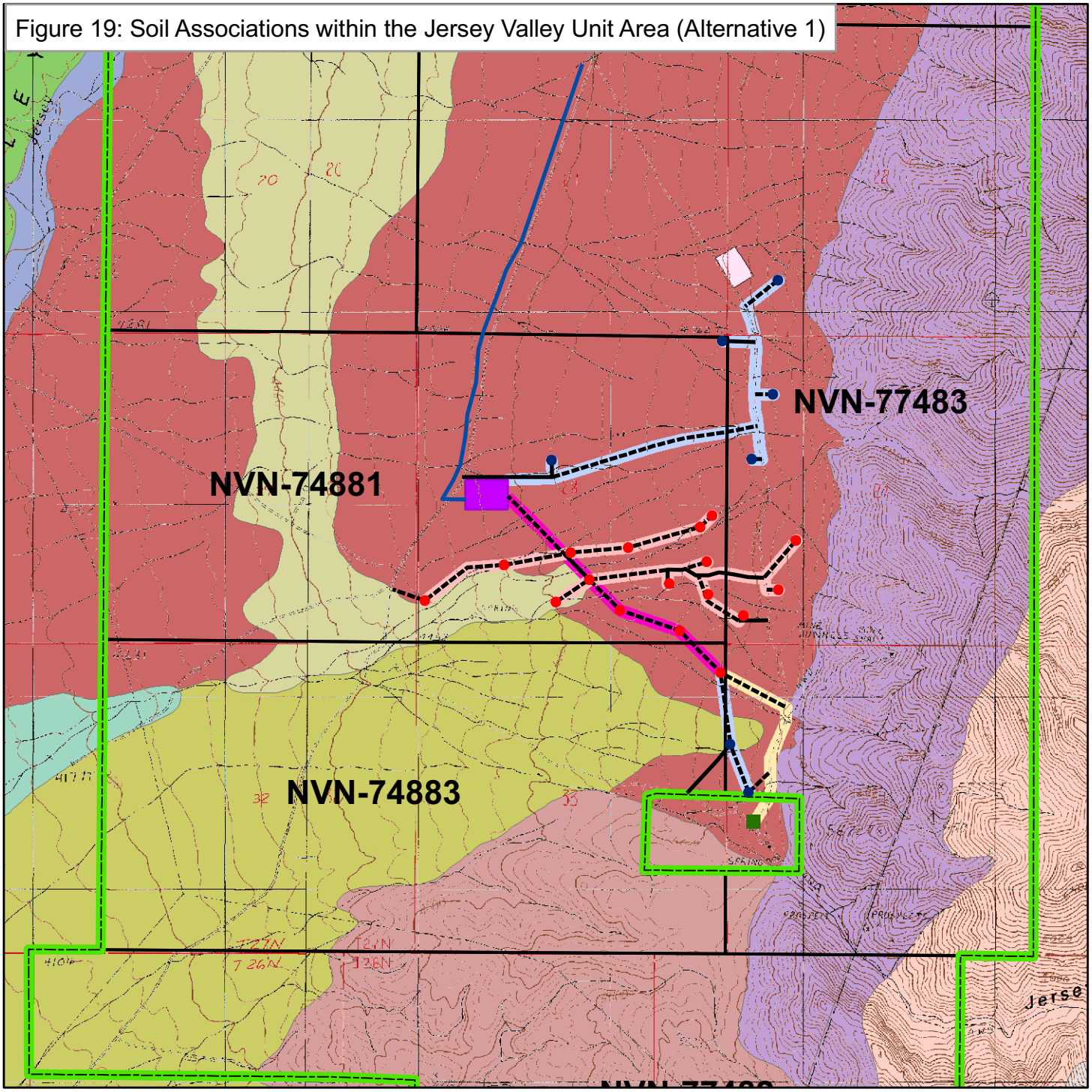
*No warranty is made by the Bureau of Land Management as to the accurracy, reliability, or completeness of these data for individual use or aggregate use with other data.

The data shown on the map uses the Universal Transmercator (Zone 11N) Coordinate system and uses the NAD83 projection.

Map Date: March 17, 2010

N W E S

Figure 19: Soil Associations within the Jersey Valley Unit Area (Alternative 1)



LEGEND

Soil Association Symbol
- 1340
- 211
- 251
- 482
- 653
- 662
- 673
- 911

- Construction Water Source
- Existing Access Road
- Proposed Access Road
- 120 kV Power ROW - Alternative
- Proposed Power Plant Location
- Construction Water Pipelines
- Injection, Production, and Construction Water Pipelines
- Injection Pipeline
- Production Pipeline
- Currently Approved Gravel Source
- Geothermal Lease Boundary
- Jersey Valley Geothermal Unit Area (NVN-83483X)

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Map Date: March 16, 2010

N W E S

0 0.5 1 2 Miles

3.7.2 Environmental Consequences

3.7.2.1 Proposed Action

The potential for erosion within the Jersey Valley Unit Area is slight to moderate. The potential for erosion within the Buffalo Valley Unit Area and the transmission line corridor is moderate to high.

Surface disturbance and vegetation removal during construction of proposed project facilities within the Jersey Valley Unit Area, Buffalo Valley Unit Area and transmission line corridor would increase the potential for erosion through exposure of denuded surfaces. Based on implementation of environmental protection measures specified by Ormat, water would be applied to the ground during construction as necessary to control dust (see Section 2.1.11). Each of the well pads, access roads and the power plant site would be surfaced with aggregate which would minimize dust and stabilize erosive soils. Additionally, disturbed areas would be reclaimed in accordance with applicable BLM requirements (see Section 2.1.10).

An NDEP-BAPC Surface Area Disturbance Permit, documenting the areas of proposed disturbance and the best practical dust control methods to be use, will be required for activities conducted within the Jersey Valley Unit Area, Buffalo Valley Unit Area and transmission line corridor because the surface disturbed within each area would be greater than 5 acres (see Section 3.2). Implementation of the applicable best practical dust control methods, through compliance with the Surface Area Disturbance Permit, would minimize fugitive dust emissions and soil erosion from wind and water during construction, operation and decommissioning of the proposed Projects.

3.7.2.2 Alternative 1

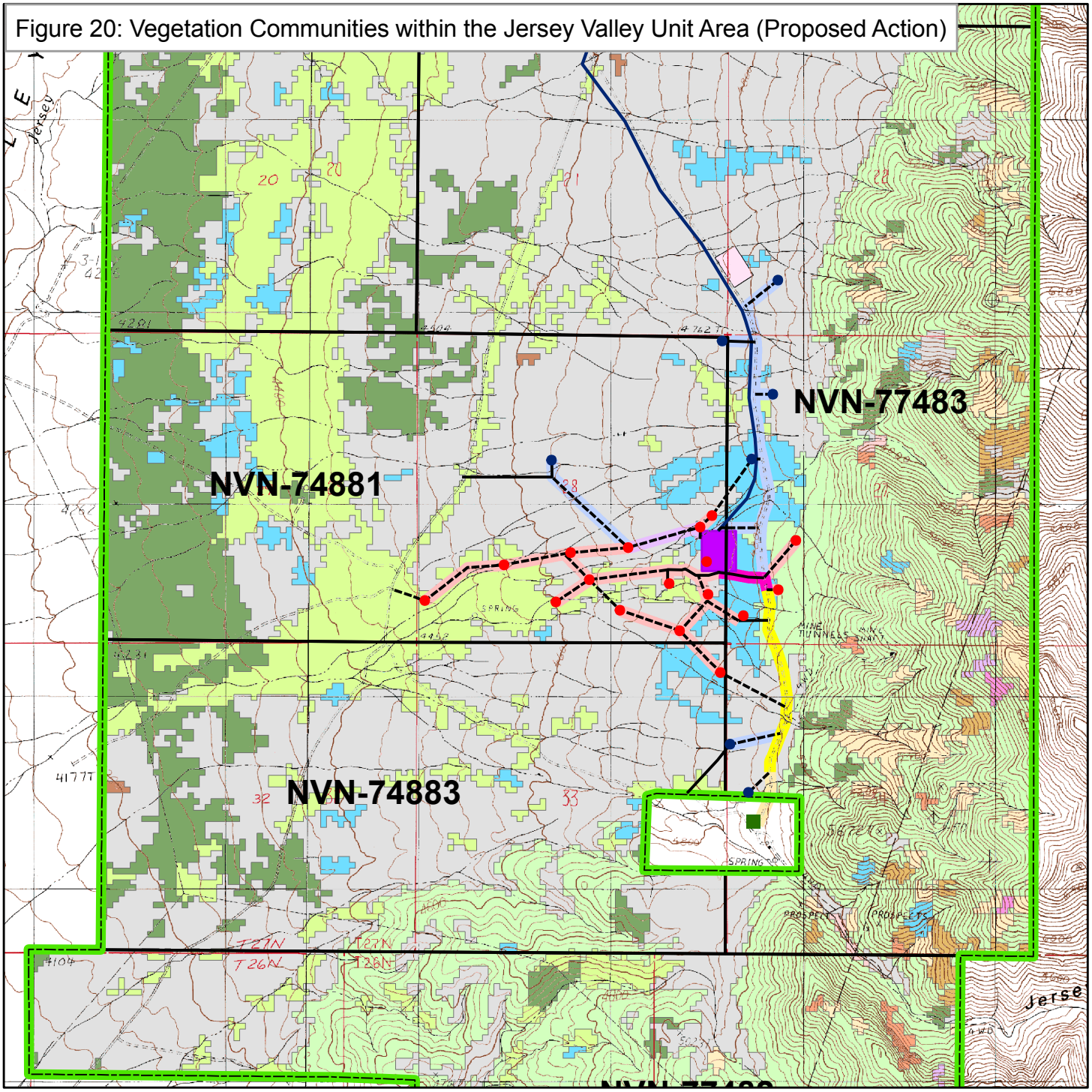
The construction, operation and maintenance of Alternative 1 would differ from the Proposed Action only by the small increase (0.25 acre) in the total permanent surface disturbance. The impacts of Alternative 1 to soils would not be different from that of the Proposed Action.

3.8 VEGETATION

3.8.1 Affected Environment

Differences in the kind of vegetation are closely related to the kind of soil. Soils within the Jersey Valley Unit Area, Buffalo Valley Unit Area and the transmission line corridor were mapped by the USDA, Natural Resource Conservation Service (NRCS) in the Lander County, North Part, soil survey and the Pershing County, East Part, soils survey (see Section 3.7.1). Vegetation communities mapped within the Jersey Valley Unit Area and Buffalo Valley Unit Area can be found in 17, Figure 18 and Figure 19).

Figure 20: Vegetation Communities within the Jersey Valley Unit Area (Proposed Action)



LEGEND

Vegetation Community

- Great Basin Foothill and Lower Montane Riparian Woodland and Shrubland
- Great Basin Pinyon-Juniper Woodland
- Great Basin Xeric Mixed Sagebrush Shrubland
- Inter-Mountain Basins Big Sagebrush Shrubland
- Inter-Mountain Basins Big Sagebrush Steppe
- Inter-Mountain Basins Cliff and Canyon
- Inter-Mountain Basins Greasewood Flat
- Inter-Mountain Basins Mixed Salt Desert Scrub
- Inter-Mountain Basins Montane Sagebrush Steppe
- Inter-Mountain Basins Semi-Desert Grassland
- Invasive Annual Grassland
- Invasive Annual and Biennial Forbland

- Construction Water Source
- Existing Access Road
- Proposed Access Road
- 120 kV Power ROW - Proposed Action
- Jersey Valley Geothermal Unit Area (NVN-83483X)
- Geothermal Lease Boundary
- Proposed Power Plant Location
- Construction Water Pipeline
- Construction Water and Injection Pipelines
- Water, Injection, and Production Pipelines
- Injection Pipeline
- Injection and Production Pipelines
- Production Pipeline
- Currently Approved Gravel Source

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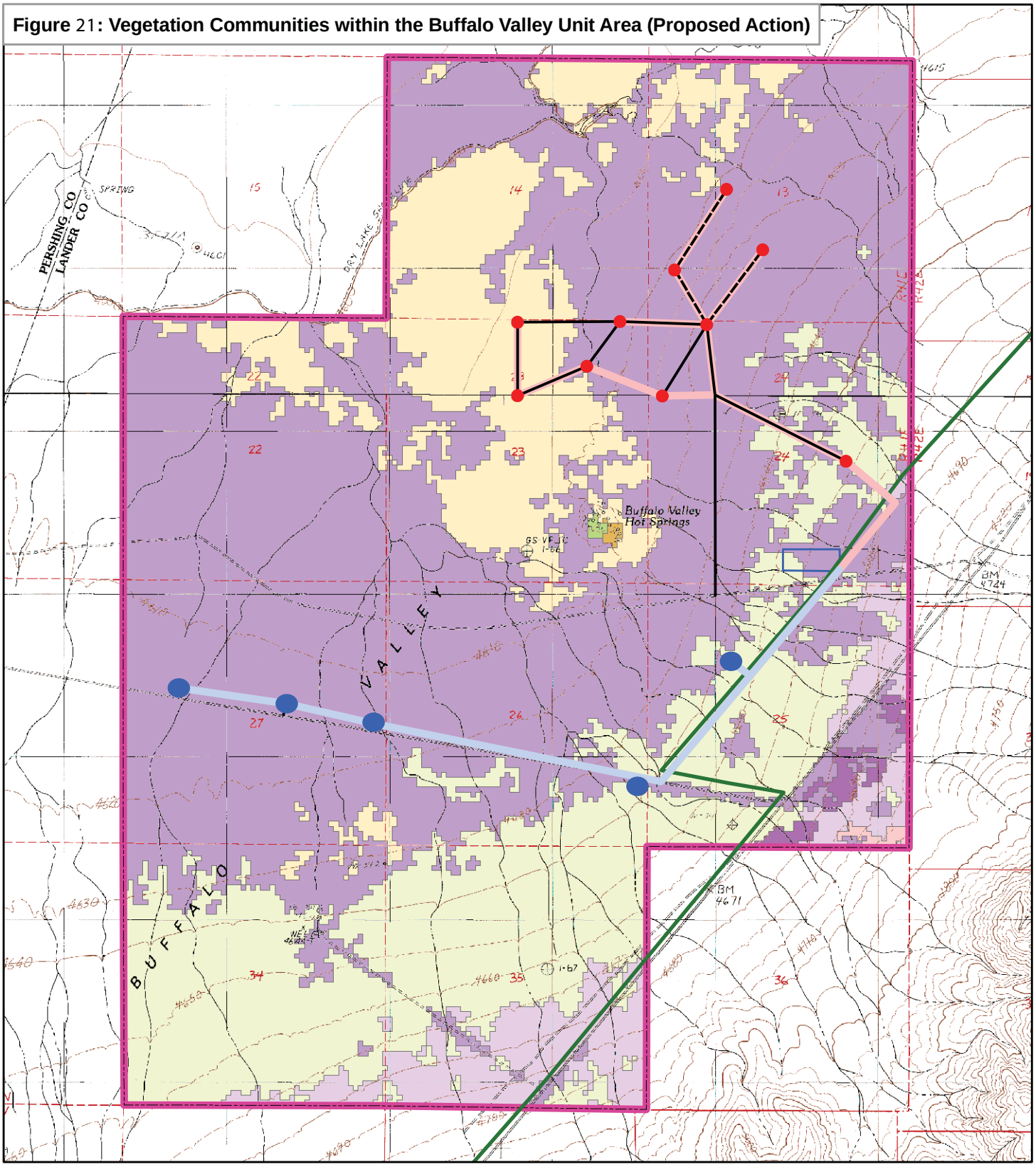
The data shown on the map uses the Universal Transmercator (Zone 11N) Coordinate system and uses the NAD83 projection.

Map Date: March 16, 2010

N W E S

0 0.25 0.5 1 Miles

Figure 21: Vegetation Communities within the Buffalo Valley Unit Area (Proposed Action)



LEGEND

- Injection Well
- Production Well
- Existing Access
- New Access
- Injection Pipeline
- Production Pipeline
- 120 kV Power ROW - Proposed
- Proposed Buffalo Valley Power Plant Location
- Buffalo Valley Geothermal Unit Area (NVN-838484X)

Vegetation Community

- Great Basin Xeric Mixed Sagebrush Shrubland
- Inter-Mountain Basins Big Sagebrush Shrubland
- Inter-Mountain Basins Greasewood Flat
- Inter-Mountain Basins Mixed Salt Desert Scrub
- Inter-Mountain Basins Playa
- Inter-Mountain Basins Semi-Desert Grassland
- Invasive Annual and Biennial Forbland
- North American Arid West Emergent Marsh

0 0.25 0.5 1 Miles

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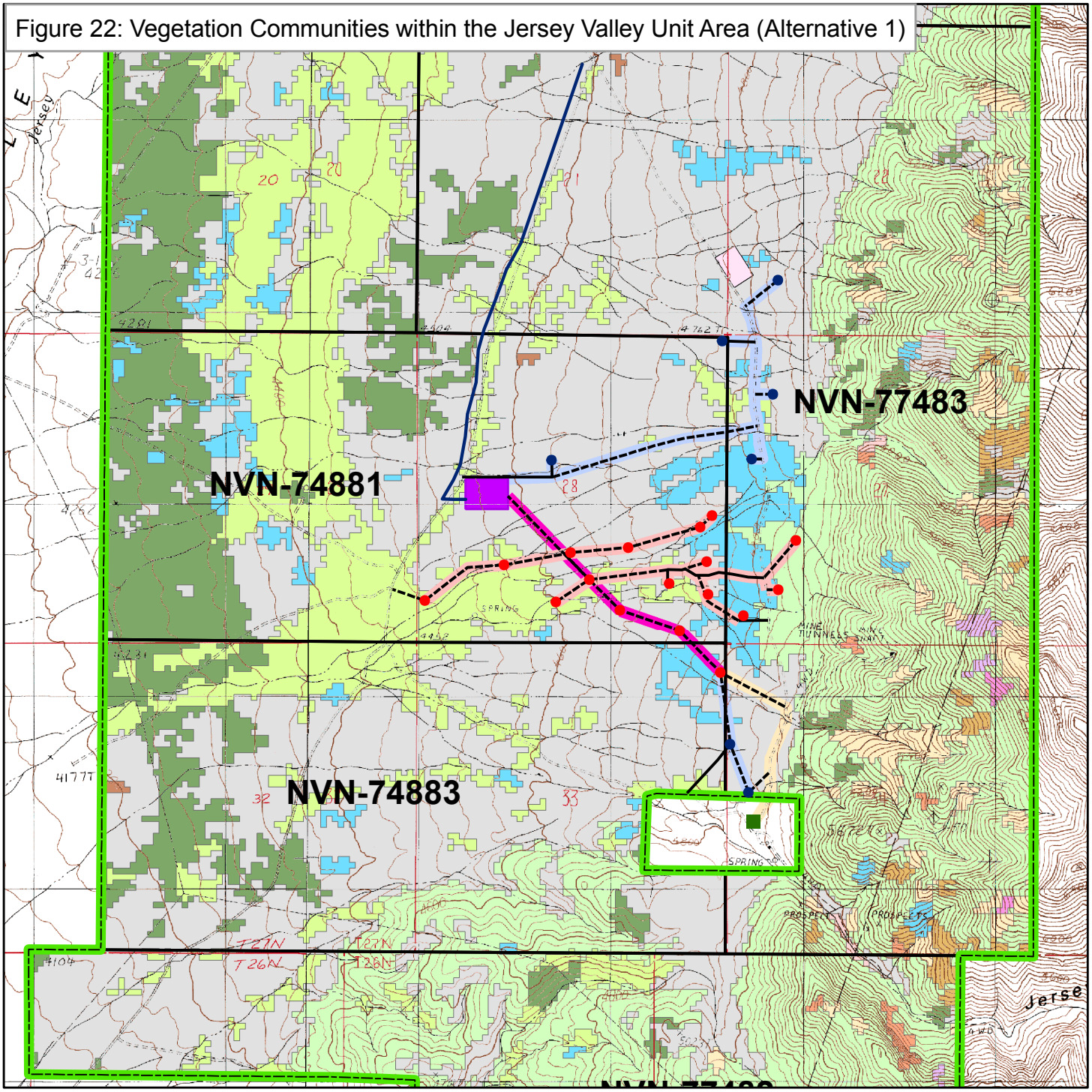
The data shown on the map uses the Universal Transmercator (Zone 11N) Coordinate system and uses the NAD83 projection.

Map Date: March 16, 2010

N W E S

Figure 22: Vegetation Communities within the Jersey Valley Unit Area (Alternative 1)



LEGEND

Vegetation Community

- Great Basin Foothill and Lower Montane Riparian Woodland and Shrubland
- Great Basin Pinyon-Juniper Woodland
- Great Basin Xeric Mixed Sagebrush Shrubland
- Inter-Mountain Basins Big Sagebrush Shrubland
- Inter-Mountain Basins Big Sagebrush Steppe
- Inter-Mountain Basins Cliff and Canyon
- Inter-Mountain Basins Greasewood Flat
- Inter-Mountain Basins Mixed Salt Desert Scrub
- Inter-Mountain Basins Montane Sagebrush Steppe
- Inter-Mountain Basins Semi-Desert Grassland
- Invasive Annual Grassland
- Invasive Annual and Biennial Forbland

- Construction Water Source
- Existing Access Road
- Proposed Access Road
- 120 kV Power ROW - Alternative
- Jersey Valley Geothermal Unit Area (NVN-83483X)
- Geothermal Lease Boundary
- Proposed Power Plant Location
- Construction Water Pipeline
- Injection, Production, and Construction Water Pipelines
- Injection Pipeline
- Production Pipeline
- Currently Approved Gravel Source

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Map Date: March 16, 2010

N W E S

0 0.25 0.5 1 Miles

The only recorded fire within the Jersey Valley Unit Area, Buffalo Valley Unit Area and proposed transmission line corridor was the Gooseberry Fire which burned within the very southwest corner of the Jersey Valley Unit Area in 2001.

3.8.2 Environmental Consequences

3.8.2.1 Proposed Action

Surface disturbance associated with the proposed Project activities within the Jersey Valley Unit Area, Buffalo Valley Unit Area and transmission line corridor would result in the loss of vegetation.

Approximately 133.17 acres of the proposed disturbance within the Jersey Valley Unit Area, Buffalo Valley Unit Area and transmission line corridor is "temporary" (see Table 5) and vegetation can be allowed to recover after construction is completed.

Approximately 124.67 acres of proposed disturbance within the Jersey Valley Unit Area, Buffalo Valley Unit Area and transmission line corridor is "permanent" (see Table 5) and would be "lost" over the life of the proposed Projects, but would be recovered without residual impact after site reclamation commences.

Disturbed areas could have an increase in cheatgrass compared to non-disturbed areas (see Section 3.6).

As part of the Project, disturbed areas would be reclaimed in accordance with applicable BLM requirements. The following mitigation measure is recommended to seed disturbed areas with seed mixtures and minimize the spread of invasive, nonnative species.

Mitigation Measures:

Seeding of disturbed areas associated with soil association 211 would be completed using the following BLM-approved native seed mixture and application rate:

Common Name	Scientific Name	Pounds/acre (bulk)
Indian Ricegrass	*Oryzopsis hymenoides*	3.40
Bottlebrush Squirreltail	*Elymus elymoides*	1.70
Needle and Thread	*Stipa Comata*	3.78
Scarlet Globemallow	*Sphaeralcea coccinea*	0.78

Seeding of disturbed areas associated with soil associations 662, 673, 2711, 2721, 2555, 251, 652 and 1340 would be completed using the following BLM-approved native seed mixture and application rate:

Common Name	Scientific Name	Pounds/acre (bulk)
Basin Wildrye	*Leymus cinereus*	4.65
Indian Ricegrass	*Oryzopsis hymenoides*	1.70
Alkali sacaton	*Sporoblus airoides*	0.12
Scarlet Globemallow	*Sphaeralcea coccinea*	0.52

Seeding of disturbed areas associated with soil association 653 would be completed using the following BLM-approved native seed mixture and application rate:

Common Name	Scientific Name	Pounds/acre (bulk)
Bluebunch Wheatgrass	*Pseudoroegneria spicata* ssp. *spicata*	6.22
Basin Wildrye	*Leymus cinereus*	2.61
Thurbers Needlegrass	*Stipa thurberiana*	5.23

Seeding of disturbed areas associated with soil association 2066 would be completed using the following BLM-approved native seed mixture and application rate:

Common Name	Scientific Name	Pounds/acre (bulk)
Indian Ricegrass	*Oryzopsis hymenoides*	3.40
Bottlebrush Squirreltail	*Elymus elymoides*	1.58
Needle and Thread	*Stipa Comata*	3.78
Scarlet Globemallow	*Sphaeralcea coccinea*	0.78

Seeding of disturbed areas associated with soil association 1140, 740, 1169, 1570 and 1145 would be completed using the following BLM-approved native seed mixture and application rate:

Common Name	Scientific Name	Pounds/acre (bulk)
Basin Wildrye	*Leymus cinereus*	4.65
Alkali sacaton	*Sporoblus airoides*	0.45
Bottlebrush Squirreltail	*Elymus elymoides*	1.70

Seeding of disturbed areas associated with soil association 247 would be completed using the following BLM-approved native seed mixture and application rate:

Common Name	Scientific Name	Pounds/acre (bulk)
Bottlebrush Squirreltail	*Elymus elymoides*	4.16
Basin Wildrye	*Leymus cinereus*	2.61
Indian Ricegrass	*Oryzopsis hymenoides*	2.34

Seeding of disturbed areas associated with soil associations 596, 661, 670, 701, 835 and 2062 would be completed using the following BLM-approved native seed mixture and application rate:

Common Name	Scientific Name	Pounds/acre (bulk)
Indian Ricegrass	*Oryzopsis hymenoides*	3.40
Bottlebrush Squirreltail	*Elymus elymoides*	1.58
Needle and Thread	*Stipa Comata*	3.78
Scarlet Globemallow	*Sphaeralcea coccinea*	0.78
Basin Big Sagebrush	*Artemisia tridentata* ssp. *tridentata*	0.31

Seeding of disturbed areas associated with soil association 1292 would be completed using the following BLM-approved native seed mixture and application rate:

Common Name	Scientific Name	Pounds/acre (bulk)
Bottlebrush Squirreltail	*Elymus elymoides*	4.16
Basin Wildrye	*Leymus cinereus*	2.61
Indian Ricegrass	*Oryzopsis hymenoides*	2.34
Basin Big Sagebrush	*Artemisia tridentata* ssp. *tridentata*	0.31

Seeding of disturbed areas associated with soil association 1292 would be completed using the following BLM-approved native seed mixture and application rate:

Common Name	Scientific Name	Pounds/acre (bulk)
Basin Wildrye	*Leymus cinereus*	4.65
Alkali sacaton	*Sporoblus airoides*	0.45
Bottlebrush Squirreltail	*Elymus elymoides*	1.70
Basin Big Sagebrush	*Artemisia tridentata* ssp. *tridentata*	0.31

Following the implementation of these mitigation measures, there should be no residual impacts to vegetation.

Implementation of the proposed action would increase the potential for human caused fires during construction and operation of the proposed Project(s). Accidental discharge during transportation and storage of flammable materials or chemicals (such as pentane or fuel) could accelerate the ignition of fires along the County Road or at the power plant site. Impacts from these fires would vary based on fire size and could result in the destruction of structures, livestock forage, and wildlife habitat.

A hazardous material handling, storage and transportation plan has been produced and would reduce the potential for fires (see Section 3.11). Ormat has also proposed environmental protection measures to further reduce the potential for human caused fires (see Section 2.1.11).

Power transmission lines have been known to start fires either from arcing or electrocution of birds. Installation of anti electrocution perching sites on power poles and maintenance of roads and/or constructing fuel breaks along the Rights of Way would also reduce potential impacts.

3.8.2.2 Alternative 1

The construction, operation and maintenance of Alternative 1 would differ from the Proposed Action only by the small increase (0.25 acre) in the total permanent surface disturbance. The impacts of Alternative 1 to vegetation would not be different from that of the Proposed Action. The mitigation measures recommended for the Proposed Action would be equally applicable to Alternative 1.

3.9 WATER QUALITY AND QUANTITY

3.9.1 Affected Environment

The Nevada State Engineer of the Division of Water Resources, Department of Conservation and Natural Resources (NDCNR-DWR) places the Jersey Valley Unit Area within the 142 square mile Jersey Valley Hydrographic Area (Number 132 of 232 in the State of Nevada) (NDCNR-DWR 2009a). The Buffalo Valley Unit Area is located within the adjacent (to the north) 504 square mile Buffalo Valley Hydrographic Area (Number 131 of 232 in the State of Nevada) (NDCNR-DWR 2010a; NDCNR-DWR 2005). The Jersey Valley and Buffalo Valley Hydrographic Areas are both located within the Central Hydrographic Region (Number 10 of 14 in the State of Nevada), which covers nearly 30 million acres. The Jersey Valley Hydrographic Area makes up approximately 0.3 percent (about 91,000 acres) of the Central Hydrographic Region. The Buffalo Valley Hydrographic Area makes up approximately 1.0 percent (323,000 acres) of the Central Hydrographic Region.

Jersey Valley Area

The Jersey Valley Hydrographic Area is one of seven ground water basins that are connected with the Dixie Valley ground water basin (Hydrographic Area Number 128), which together form a closed hydrologic unit referred to as the Dixie-Fairview Valley Area (Cohen and Everett 1963). All seven of these ground water basins were “designated” by the State Engineer in 1978 in order to better manage the ground water in Dixie Valley (NDCNR-DWR 2005; NDCNR-DWR 1978). “Designating” a basin gives the Nevada State Engineer additional authority in the administration of the water resources within that basin. Basins are typically “designated” by the State Engineer when permitted ground water rights approach or exceed the estimated average recharge. The Dixie Valley ground water basin has committed ground water rights of approximately 30,700 acre-feet per year (AFY), and an estimated perennial yield (the

amount of water that can be drawn indefinitely without depleting the resource) of 15,000 AFY (NDCNR-DWR 2010b).

The Jersey Valley Hydrographic Area ground water basin is recharged by precipitation, primarily spring snowmelt resulting in seasonal stream flows. Near-surface ground water is primarily stored in unconsolidated sedimentary deposits that range from a few hundred feet thick in Jersey Valley to over 1,000 feet thick in Dixie Valley (Cohen and Everett 1963). Ground water movement is transmitted mostly through unconsolidated sediments in the valley floor and, to a lesser extent, through localized areas of highly fractured consolidated rocks. Ground water from the Jersey Valley basin eventually flows to the southwest and contributes to the Dixie Valley Hydrographic Area ground water basin recharge.

The Jersey Valley Hydrographic Area has committed ground water rights of 27.25 AFY and an estimated perennial yield of 250 AFY. The manner of use for all of the committed ground water rights is reported as industrial (NDCNR-DWR 2009a). The point of diversion for this ground water use is located within the privately owned land block within the JV Unit Area in the NW¼SW¼ of Section 34, T27N, R40E (see Figure 8). The application for this ground water right was filed on March 25, 2009 (NDCNR-DWR 2009b). As of January 2010, the NDCNR-DWR had no well drill log records available for this ground water diversion point (NDCNR-DWR 2010c).

There is one recorded ground water well located within five miles of the Jersey Valley hot springs. This well, currently owned by the BLM, is located in the Jersey Valley Hydrographic Area, approximately 4 miles southwest of the Jersey Valley unit area, in the SE¼, SW¼ of Section 11, T26N, R39E (see Figure 8). The well was constructed in 1957 to a total depth of 200 feet with a reported depth to ground water of 138 feet (NDCNR-DWR 2010c). Subsequent measurements of the depth to ground water in this well, taken during 1981 and 1982, show a consistent depth to ground water of 136 feet (USGS 2009b). The USGS has no available ground water quality data from this well (USGS 2009c).

Between 1981 and 1982, fourteen geothermal exploration (temperature gradient) “wells” were drilled within five miles of the Jersey Valley unit area. Of these, nine are located within the Jersey Valley unit area (NDCNR-DWR 2010c). All of these geothermal exploration “wells” were drilled to relatively shallow depths (ranging from 340 feet to 500 feet). The NDWR does not list these wells as plugged and abandoned, although the drilling logs on file indicate that they were sealed with cement upon completion. No depth-to-ground water measurements or water quality data are available for any of these geothermal exploration “wells” (NDNR-DWR 2010c).

Surface water within the Jersey Valley unit area is limited to a few springs and associated ponds and a few west-flowing stream channels. Figure 8 shows streams flowing out of Jersey Canyon, Butcher Canyon and several unnamed canyons within the unit area. These streams are either ephemeral (flowing only during or immediately after rain events) or intermittent (flowing part of the year, principally due to rain events and spring snowmelt, but dry the rest of the year). No stream flow or water quality data are available for these streams.

Figure 8 also shows five springs within the Jersey Valley unit area. The easternmost spring is a cold water spring located at the mouth of Jersey Canyon on private land within the Jersey Valley unit area in the NW¼SW¼ of Section 34. The northernmost spring, located in Section 15, and the westernmost spring, located in the center of Section 29, are both small hot springs/seeps with little flow.

The other two springs, located in the center of the unit area in the SW¼, SW¼ of Section 28 and the SE¼, SE¼ of Section 29, respectively, have been singly and collectively referred to as the Jersey Hot Springs. The spring located in Section 28 consists of a number of seeps which provide little flow. Due to the condition of the springs/seeps, the area cannot be accurately monitored. The spring located in Section 29 maintains a flow that supports a small pool and is commonly known as the main Jersey Hot Spring. These springs have temperatures reported at 29°C to 57°C (84°F to 135°F) (NBMG, 2004). Samples from the Jersey Hot Springs pool have shown it to principally be a sodium chloride/calcium sulfate water with a total dissolved solids (TDS) concentration of about 700 parts per million (ppm) and a temperature of 123°F (Ormat 2008). Boron concentrations (a chemical element generally diagnostic for geothermal waters) averaged about 1.75 ppm (see Table 8).

Table 8: Chemical Species Information for the Jersey Valley and Buffalo Valley Hot Springs

Chemical Species Concentrations (ppm)			
Species	**Jersey Valley Hot Springs**	**Jersey Valley Wells**	**Buffalo Valley Hot Springs**
Ammonia (NH4)	0.80 - 1.30	0.00 - 0.54	0.00 - 0.00
Potential of Hydrogen (pH)	7.00 - 7.52	7.28 - 9.34	5.98 - 7.26
Bicarbonate (HCO3)	82.00 - 350.00	153.70 - 386.20	212.18 - 238.37
Carbonate (CO3)	9.60 - 9.60	0.00 - 73.67	0.00 - 0.00
Total Alkalinity	28.00 - 290.00	0.00 - 320.00	0.00 - 0.00
Orthophosphate, as P	0.01 - 0.01	0.00 - 0.34	0.00 - 0.00
Chloride (Cl)	58.00 - 286.00	136.80 - 2398.00	23.75 - 45.99
Fluoride (F)	0.81 - 8.00	6.96 - 18.00	0.77 - 1.33
Sulfate (SO4)	110.00 - 352.00	104.67 - 431.00	35.20 - 53.78
Nitrate Nitrogen (NO3)	0.29 - 0.35	0.00 - 0.76	0.00 - 0.00
Total Dissolved Solids (TDS)	670.00 - 700.00	1100.00 - 4972.00	114.00 - 433.00
Electrical Conductivity	890.00 - 990.00	1400.00 - 8220.00	340.00 - 420.00
Aluminum (Al)	0.00 - 0.00	0.00 - 1.89	0.00 - 0.00
Barium (Ba)	0.10 - 0.14	0.19 - 3.18	0.20 - 0.31
Beryllium (Be)	0.00 - 0.00	0.00 - 0.003	0.00 - 0.00
Boron (B)	1.40 - 2.74	2.00 - 2.38	0.00 - 0.00
Calcium (Ca)	25.00 - 43.84	9.20 - 1185.00	67.03 - 83.81
Chromium (Cr)	0.08 - 0.10	0.00 - 0.34	0.00 - 0.00
Copper (Cu)	0.00 - 0.00	0.00 - 0.00	0.18 - 0.24
Iron (Fe)	0.04 - 0.07	0.07 - 6.36	0.10 - 0.23
Lead (Pb)	0.00 - 0.00	0.00 - 0.012	0.00 - 0.00
Lithium (Li)	1.10 - 1.61	0.49 - 5.99	0.00 - 0.00
Magnesium (Mg)	3.30 - 6.19	1.40 - 8.66	7.74 - 14.19
Manganese (Mn)	0.13 - 0.18	0.08 - 0.98	0.03 - 0.05
Potassium (K)	19.00 - 32.17	28.67 - 136.23	0.00 - 0.00
Silicon Dioxide (Si02)	120.00 - 199.56	115.11 - 315.00	57.90 - 106.57
Sodium (Na)	160.00 - 293.30	223.48 - 593.78	30.69 - 39.73
Strontium (Sr)	0.64 - 0.81	0.35 - 20.64	0.30 - 0.37

Chemical Species Concentrations (ppm)			
Species	**Jersey Valley Hot Springs**	**Jersey Valley Wells**	**Buffalo Valley Hot Springs**
Zinc (Zn)	0.00 - 0.00	0.00 - 0.24	0.05 - 0.82
Mercury (Hg)	0.00 - 0.006	0.00 - 0.0088	0.00 - 0.00
Antimony (Sb)	0.00 - 0.00	0.00 - 0.18	0.00 - 0.00
Arsenic (As)	0.02 - 0.03	0.00 - 0.12	0.00 - 0.00
Thallium (Tl)	0.00 - 0.00	0.00 - 0.001	0.00 - 0.00

The NDWR lists eight points of diversion for surface water rights located within the Jersey Valley unit area. One of these is a certified irrigation right of 44.16 AFY from a stream source located on private land in Section 34. The remaining seven are vested stock water rights totaling 237.72 AFY from springs located in Sections 28 and 29 which are associated with the Jersey Hot Springs (NDCNR-DWR 2009b).

Ormat has collected and analyzed samples of geothermal fluid from several of the geothermal wells drilled and flow-tested by Ormat as part of its exploration of the Jersey Valley unit area. These produced geothermal fluids are, like the Jersey Hot Springs, a sodium chloride/calcium sulfate water, but with a substantially higher TDS concentration (approximately 2,600 ppm) (Ormat 2008) (see Table 8). Boron concentrations averaged about 2.21 ppm.

Buffalo Valley Area

The ephemeral or intermittent streams which flow out of the mountains at the edges of the Buffalo Valley Hydrographic Area eventually flow onto a playa (an often-dry desert lake bed) in the south-central portion of the valley (see Figure 9). There the surface water may occasionally form a shallow, temporary desert lake. This lake water either infiltrates into the ground or is lost due to evaporation or evapotranspiration (BLM 2002).

Ground water in the Buffalo Valley basin is stored largely within the valley's unconsolidated alluvial sediments, which range in thickness from less than one hundred feet at the valley's edge to over 1,000 feet in the valley's center (BLM 2002). Ground water in the Buffalo Valley basin is recharged by precipitation, primarily spring snowmelt resulting in seasonal stream flows. Shallow ground water movement in the Buffalo Valley basin mirrors the surface drainage system, and generally flows from the bounding mountain ranges toward the low lying playa. In the vicinity of the Buffalo Valley Unit Area, the ground water movement is generally to the northwest (Ormat Nevada, Inc undated).

Unlike Jersey Valley, the Buffalo Valley Hydrographic Area (Number 131) is not a "designated" ground water basin (NDCNR-DWR 2010a). The Buffalo Valley Hydrographic Area has an estimated perennial yield of 8,000 AFY and committed ground water rights of about 21,000 AFY. This includes water use for irrigation (approximately 7,500 AFY), mining and milling (approximately 13,200 AFY) and stock water (approximately 160 AFY) (NDCNR-DWR 2010a).

The NDCNR-DWR records list three ground water wells located within approximately five miles of the Buffalo Valley hot springs. The well designated by the USGS as number 131 N29 E42 04CDCA1 is located approximately four miles northeast of the Buffalo Valley hot springs. It was completed in 2008 to a depth of 110 feet, with an initial depth to water of 48 feet reported (NDCNR-DWR 2010d). A second well is located approximately five miles west-northwest of the hot springs. It was completed in 1948 to a depth of 425 feet (no water level depth was reported). Well number 131 N29 E41 34ADBB1 is located within the unit area, approximately two-and-one-half miles southwest of the main Buffalo Valley hot springs and 1.5 miles southwest of proposed injection well 17-25 (see **Figure 6**). This well was completed in 2008 to a depth of 95 feet, with an initial depth to water of 41 feet reported. The USGS has no water quality data records available for these ground water wells (USGS 2010a).

All three of these wells have certified underground water rights. Well 04CDCA1 has 7.24 AFY for stock water use. Well 07BCDA1 has 3.62 AFY for domestic water use. Well 34ADBB1 has 6.72 AFY for stock water use (NDCNR-DWR 2009c).

Figure 6 shows several springs located within the unit area in the SE¼ of Section 23, T29N, R41E. These hot springs, collectively called the Buffalo Valley Hot Springs, have reported surface temperatures up to 79°C (174°F), mainly from eleven springs over an area of about nine acres. The Buffalo Valley Hot Springs are a sub-circular group of many low-flow springs. They emerge from a low mound which is slightly higher than the surrounding flats. A few of the hottest springs deposit travertine, but most are too cool or have too low a flow to accumulate any deposits (NBMG 2008). The USGS reports analyses of two samples taken in the mid-1970's of the waters flowing from the Buffalo Valley hot springs (USGS 2010a). These reports show the water to be principally a sodium sulfate/chloride water with a total dissolved solids (TDS) concentration of about 1,150 parts per million (ppm) and a temperature of about 124°F. Ormat reports the analyses of four samples from the Buffalo Valley hot springs taken in 2006 (Ormat 2006) (see Table 8). These reports show the water to be principally a calcium sulfate/sodium chloride water with a total dissolved solids (TDS) concentration of only about 450 parts per million (ppm) (Ormat 2006).

Topographic maps also show a number of cool water springs located outside the northeastern corner of the Buffalo Valley unit area in Section 6 T29N, R41E and Sections 29, 31 and 32, T30N, R41E. The USGS has no water quality data records available for these cool water springs (USGS 2010a).

The NDCNR-DWR identifies one surface water right within the Buffalo Valley unit area. This is recorded as a certified stock water right of 0.80 AFY, diverted from a spring water source located in the SW¼NW¼ of Section 6 T29N, R41E. Two other surface stock water rights are associated with the springs located just to the north of the Buffalo Valley unit area in Sections 30 and 31, T30N, R41E (NDCNR-DWR 2009c). All three of these surface water rights are located at least 5 miles from the proposed Buffalo Valley power plant site.

3.9.2 Environmental Consequences

3.9.2.1 Proposed Action

The geothermal wells for both proposed Projects would be drilled using non-toxic drilling mud to prevent the loss of drilling fluids into the rock and the risk of contamination to any aquifers from the drilling fluid. Reserve pits would be constructed at each well site for the containment and temporary storage of drilling mud, drill cuttings, geothermal fluid and storm water runoff from each constructed well pad. Because non-toxic drilling mud would be used, the reserve pits are not proposed to be lined. Additionally, the bentonite drilling muds discharged into the reserve pits would tend to act as a liner, in the same way they prevent the loss of drilling fluids in the well bore into the rock. Therefore, contamination of the local ground water aquifers as a result of the temporary discharges into the reserve pits is unlikely.

Over the operational life of the project, accidental discharges of geothermal fluids could contaminate surface or ground waters. However, these are unlikely because of the frequent inspections and ultrasonic testing of the geothermal pipelines, the pipeline flow and pressure monitoring and the well pump and pipeline valve shutdown features. Contamination of surface or ground waters from spills of petroleum products (such as diesel fuel or lubricants) is also unlikely because the well pads and power plant sites, where most petroleum products would be used and stored, would be bermed to contain and control any spills. The project includes the development of a spill and disposal contingency plan which would describe the methods for cleanup and abatement of any petroleum hydrocarbon or other hazardous material spill.

During construction, the Jersey Valley Project would consume about 105 acre-feet of ground water over the anticipated 12-month construction period, principally for geothermal well drilling and dust control. The Buffalo Valley Project would use less, approximately 70 acre-feet, over its same 12-month construction period. These one-time quantities of construction water, obtained from existing private water well sources, are substantially less than the perennial yield estimated for the respective basins. Thus, there is little potential for creating any adverse affects on the quantity of either surface waters or ground waters in or adjacent to the geothermal operations areas. The following monitoring measure is proposed for the Jersey Valley project to verify the absence of adverse effects on the quantity and quality of ground waters.

Monitoring Requirement

The unit operator shall monitor the fresh water spring located on private land at the mouth of Jersey Canyon in the SE/4NW/4SW/4 of Section 34, T27N, R40E, MDB&M unless access to the spring for monitoring purposes is denied by the private landowners and the unit operator provides to BLM documentation from the private landowners that access for monitoring has been denied. The unit operator shall annually collect and analyze samples from this springs for basic water chemistry, and monitor representative flow, stage or equivalent from this spring on the following schedule, unless otherwise modified by the BLM authorized officer:

- **Once immediately prior to the commencement of drilling, and once immediately following the completion of drilling, of each new or redrilled geothermal well in the geothermal unit area;**
- **Each year until the commencement of construction of the utilization facility;**
- **Once each quarter from the commencement of construction of utilization facility until the cessation of all geothermal fluid production and injection operations from the geothermal unit area for the utilization facility; and**
- **Once each year from the cessation of all geothermal fluid production and injection operations from the geothermal unit area for the utilization facility until all geothermal wells within the geothermal unit area have been abandoned.**

Collected data shall be reported to the BLM in written form by the unit operator annually within 30 days of the end of each calendar year, together with an interpretation of the monitoring data collected during the preceding calendar year.

Due to the potential of some unknown impacts of these geothermal projects on perennial cold springs, seeps or other surface waters, the BLM will require additional monitoring of such features by the unit operator. If any such features exist within one mile of the production or injection well field of the Jersey or Buffalo Valley projects, the unit operator will monitor on a quarterly basis all such features for a period of three years upon start-up of each well field and power plant. The unit operator will work with the BLM to establish monitoring points at each such feature; and establish a written protocol to measure surface flow for each feature. It is understood that such flows are influenced by meteoric events such as spring run-off; high intensity storm events, etc.

Measures would also be taken by the proposed Projects to minimize the effects of construction and unit operations on the quality of surface and ground waters. To minimize erosion and stream channel sedimentation, storm water runoff from undisturbed areas around the constructed well pads, power plant sites and switching station would be directed into ditches surrounding the disturbed areas and back onto undisturbed ground consistent with best management practices for storm water. Access roads would also be constructed and maintained consistent with the best management practices for road construction applicable to the intended use (temporary or permanent) of the road. To minimize erosion and stream channel sedimentation, grading or clearing of the surface for construction of the transmission line would occur only when absolutely necessary for safe access or installing the conductors and would only occur within the proposed ROW.

The geothermal wells would be cased with steel to a depth well below the shallow ground water reservoirs. The casing would be cemented into the ground to prevent the loss of any geothermal resource into, and prevent the contamination or mixing of, any shallow ground waters by the geothermal production or injection fluid. The Underground Injection Control Permit required for the project's injection program from the Nevada Department of Environmental Protection-Bureau of Water Pollution Control (NDEP-BWPC) would require that the injection program be designed and monitored to prevent degradation of underground sources of drinking water due to the geothermal fluid injection practices.

By their very nature, geothermal fluid production and injection operations change the distribution of pressures in the developed geothermal reservoirs. The sources of the thermal waters which discharge from the Jersey Valley and Buffalo Valley Hot Springs could be substantially connected to the geothermal reservoirs to be developed by these proposed Projects. If this were the case, it is possible that the geothermal production and injection operations could alter the pressures in the hot spring thermal reservoirs sufficiently to cause the flow of the hot springs to increase, diminish or even cease. It is also possible that the hot springs discharge from reservoirs which are isolated from the geothermal reservoirs to be developed by the Projects. In this case, these geothermal reservoirs could be developed for the Projects without risk of altering the flows of the Jersey Valley and Buffalo Valley hot springs.

Insufficient information is currently available to know the nature of, and relationship between, the geothermal reservoirs to be produced for the proposed Projects and the thermal reservoirs from which the hot springs flow. The geothermal leases on which these proposed Projects would be developed contain stipulations which require the monitoring of the quality, quantity and temperature of the adjacent hot springs; and prohibit adverse impacts to these hot springs from lease activities (see Appendix A). To determine if adverse changes to the hot springs may be occurring, and to comply with federal geothermal lease stipulations applicable to these proposed Projects, a progressive geothermal resource monitoring program could be implemented. Should this monitoring program indicate that adverse impacts to the hot springs may be occurring, the unit operator would be required to retain a competent consultant, acceptable to the BLM, to evaluate the collected data and recommend appropriate, reasonable mitigation measures. A group consisting of the applicable stakeholders would be convened to review the recommended measures. Such mitigation measures may include providing compensation to the current water rights holder, if any; providing supplemental geothermal fluids to the affected hot springs; and/or the implementation of geothermal reservoir management techniques (such as altering geothermal production and injection well pressures, locations and depths), which are often employed to change the pressure distribution in geothermal reservoirs to modify or reverse adverse pressure changes. The effectiveness of any implemented mitigation measures and/or reservoir management techniques could be evaluated by the ongoing information collected by the geothermal reservoir monitoring program, and adjusted as necessary.

The following monitoring and mitigation measures are proposed for Jersey Valley and Buffalo Valley projects.

Mitigation Measures

Jersey Valley

The unit operator shall monitor and collect representative temperature; flow, stage or equivalent; and basic thermal water chemistry from each of the two springs known as the Jersey Valley Hot Springs, which are located in the SW¼, SW¼ of Section 28 and the SE¼, SE¼ of Section 29, respectively.

The unit operator shall monitor and collect representative temperature; flow, stage or equivalent; and basic thermal water chemistry from these hot springs on the following schedule, unless otherwise modified by the BLM authorized officer:

- **Once immediately prior to the commencement of drilling, and once immediately following the completion of drilling, of each new or redrilled geothermal well in the geothermal unit area;**
- **Each year until one year before the commencement of geothermal fluid production and injection operations from the geothermal unit area for the utilization facility;**
- **Once each quarter from one year before the commencement of geothermal fluid production and injection operations from the geothermal unit area for the utilization facility until the cessation of all geothermal fluid production and injection operations from the geothermal unit area for the utilization facility; and**
- **Once each year from the cessation of all geothermal fluid production and injection operations from the geothermal unit area for the utilization facility until all geothermal wells within the geothermal unit area have been abandoned.**

Collected data shall be reported to the BLM in written form by the unit operator within 30 days of its receipt. The unit operator shall also submit an annual report to the BLM within 30 days of the end of each calendar year summarizing and interpreting the monitoring data collected during the preceding calendar year.

If the BLM authorized officer determines that the available monitoring information indicates the need for further monitoring information to determine if unit operations are creating adverse impacts to the hot springs, then the BLM authorized officer may require that the unit operator conduct additional monitoring of the hot springs, including:

- **Collection of monitoring data at increased monitoring frequencies;**
- **Collection of additional monitoring parameters from current monitoring locations; and/or**
- **Collection of monitoring data from additional monitoring locations.**

Should this monitoring program demonstrate that adverse impacts to the hot springs may be occurring, the unit operator shall, as required by the BLM authorized officer, immediately retain a qualified third-party consultant, acceptable to the BLM authorized officer, to review the collected data and to evaluate the collected data and recommend reasonable mitigation measures. A group consisting of the applicable stakeholders, including the current holder of water rights from the hot springs, if any, would be convened to review the recommended measures. Such measures may include:

- **Providing compensation to the current water rights holder for the loss of any water rights from the hot springs;**

- **Providing geothermal fluids to the affected hot springs of a quality and quantity sufficient to restore the pre-production temperature; flow, stage or equivalent; and basic thermal water chemistry of the hot springs; and/or**
- **Implementing appropriate geothermal reservoir management techniques to adjust the geothermal reservoir pressure regime and reduce and/or reverse these adverse affects to the hot springs. Such geothermal reservoir management techniques may include:**
  - **Modifying the volume (and/or pressure) of geothermal fluids produced from one or more production wells within the geothermal unit area field and monitor the reservoir and hot spring response;**
  - **Modifying the volume (and/or pressure) of geothermal fluids injected into one or more injection wells within the geothermal unit area field and monitor the reservoir and hot spring response; and/or**
  - **Discontinuing the use of one or more geothermal unit area production or injection well(s);**
  - **Changing the depth of geothermal fluid injection in one or more geothermal unit area injection wells;**
  - **Relocating one or more production or injection well(s) within the geothermal unit area; and/or**
  - **Any other measure as directed by the BLM authorized officer which, pursuant to the lease stipulations, may include shutting down the operation.**

Buffalo Valley

The unit operator shall monitor and collect representative temperature; flow, stage or equivalent; and basic thermal water chemistry from those springs located in the SE¼ of Section 23, T29N, R41E, collectively known as the Buffalo Valley Hot Springs.

The unit operator shall monitor and collect representative temperature; flow, stage or equivalent; and basic thermal water chemistry from these hot springs on the following schedule, unless otherwise modified by the BLM authorized officer:

- **Once immediately prior to the commencement of drilling, and once immediately following the completion of drilling, of each new or redrilled geothermal well in the geothermal unit area;**
- **Each year until one year before the commencement of geothermal fluid production and injection operations from the geothermal unit area for the utilization facility;**
- **Once each quarter from one year before the commencement of geothermal fluid production and injection operations from the geothermal unit area for the utilization facility until the cessation of all geothermal fluid production and injection operations from the geothermal unit area for the utilization facility; and**
- **Once each year from the cessation of all geothermal fluid production and injection operations from the geothermal unit area for the utilization facility until all geothermal wells within the geothermal unit area have been abandoned.**

Collected data shall be reported to the BLM in written form by the unit operator within 30 days of its receipt. The unit operator shall also submit an annual report to the BLM within 30 days of the end of each calendar year summarizing and interpreting the monitoring data collected during the preceding calendar year.

If the BLM authorized officer determines that the available monitoring information indicates the need for further monitoring information to determine if unit operations are creating adverse impacts to the hot springs, then the BLM authorized officer may require that the unit operator conduct additional monitoring of the hot springs, including:

- **Collection of monitoring data at increased monitoring frequencies;**
- **Collection of additional monitoring parameters from current monitoring locations; and/or**
- **Collection of monitoring data from additional monitoring locations.**

Should this monitoring program demonstrate that adverse impacts to the hot springs may be occurring, the unit operator shall, as required by the BLM authorized officer, immediately retain a qualified third-party consultant, acceptable to the BLM authorized officer, to review the collected data and to evaluate the collected data and recommend reasonable mitigation measures. A group consisting of the applicable stakeholders including the current holder of water rights from the hot springs, if any, would be convened to review the recommended measures. Such measures may include:

- **Providing compensation to the current water rights holder for the loss of any water rights from the hot springs;**
- **Providing geothermal fluids to the affected hot springs of a quality and quantity sufficient to restore the pre-production temperature; flow, stage or equivalent; and basic thermal water chemistry of the hot springs.; and/or**
- **Implementing appropriate geothermal reservoir management techniques to adjust the geothermal reservoir pressure regime and reduce and/or reverse these adverse affects to the hot springs. Such geothermal reservoir management techniques may include:**
  - **Modifying the volume (and/or pressure) of geothermal fluids produced from one or more production wells within the geothermal unit area field and monitor the reservoir and hot spring response;**
  - **Modifying the volume (and/or pressure) of geothermal fluids injected into one or more injection wells within the geothermal unit area field and monitor the reservoir and hot spring response; and/or**
  - **Discontinuing the use of one or more geothermal unit area production or injection well(s);**
  - **Changing the depth of geothermal fluid injection in one or more geothermal unit area injection wells;**
  - **Relocating one or more production or injection well(s) within the geothermal unit area; and/or**

- **Any other measure as directed by the BLM authorized officer which, pursuant to the lease stipulations, may include shutting down the operation.**

3.9.2.2 Alternative 1

The impacts to water quality and quantity from the alternative power plant location and modified pipeline system and road network within the Jersey Valley Unit Area would be the same as those described for the Proposed Action. The location of the Jersey Valley power plant site closer to the central part of Jersey Valley may result in a very small reduction in the potential for conflicts between the mineral claimant and the power plant in the Jersey Valley Unit Area.

3.10 WETLANDS AND RIPARIAN

3.10.1 Affected Environment

The Jersey Valley Unit Area contains two spring areas. Both springs appeared to be perennial based on the vegetation at each site (GBE 2008).

The spring in the SW1/4 Section 28, at one time, had a meadow area associated with the spring area. However, this area has received heavy use by livestock and the meadow grasses have been largely replaced by annual weeds. Salt grass was still present in some patches. Rushes (*Juncus* sp.) were present in an area immediately adjacent to the spring source. The spring source was primarily vegetated with cattail (*Typhus* sp.). The spring brook extended approximately 150 feet from the spring source on May 13, 2008 (GBE 2008).

The second spring in the SE1/4 Section 29 was directed to a reservoir. However, the flow to the reservoir was very limited and the reservoir had silted in over the years. Based on the amount of riparian vegetation, the flow from the spring apparently reaches the reservoir area as subsurface flow. The area had an outer “ring” of rushes and central area of cattails and sedges (*Carex* sp.) (GBE 2008).

No perennial streams were observed in the Jersey Valley Unit Area. Total riparian vegetation within the Jersey Valley Unit Area is approximately 9 acres.

Within the Buffalo Valley Unit Area, the Buffalo Valley Hot Springs (SE1/4 Section 23, T.29N. R.41E.) were the only perennial water. This spring complex was within a playa area with very little vegetation in the playa except for the area immediately adjacent to the spring. The edges of the playa included a band of saltgrass before transitioning to the salt desert shrub community (GBE 2008).

Within the transmission line corridor, there were no springs, riparian areas or wetlands. The corridor crossed several ephemeral drainages, but none were conveying any surface flow during the survey referenced in Section 3.5 (GBE 2008).

3.10.2 Environmental Consequences

3.10.2.1 Proposed Action

As there are no surface disturbing activities proposed within any riparian area, there will be no direct impacts to riparian vegetation. Additionally, geothermal lease stipulations (see Appendix A), direct that adverse impacts to springs are not allowed, therefore indirect impacts to the associated riparian vegetation are not anticipated. Mitigation requiring hydrologic monitoring has been recommended (see Section 3.9.2).

3.10.2.2 Alternative 1

The impacts of Alternative 1 to Wetlands and Riparian Resources would not be different from that of the Proposed Action.

3.11 WASTES (HAZARDOUS AND SOLID)

3.11.1 Affected Environment

There are no hazardous material storage facilities in the Jersey Valley Unit Area, Buffalo Valley Unit Area, or transmission line corridor, nor are hazardous materials known to be routinely used. The transport and handling of hazardous materials in Nevada are subject to numerous federal and state laws and regulations.

3.11.2 Environmental Consequences

3.11.2.1 Proposed Action

Diesel fuel, lubricants, hydraulic fluids and drilling chemicals (drilling mud, caustic soda, barite, etc.), would be transported to, stored on and used by the project at the proposed drill sites (see Table 9). The project must conform to both federal and state requirements for handling these hazardous/regulated wastes materials. Typical of most construction projects, the storage and use of these materials may result in minor, incidental spills of diesel fuel or oil to the ground during fueling of equipment, filling of fuel storage tanks, and handling lubricants. Other incidental spills could be associated with equipment failures such as ruptured hoses. The project includes the development of a hazardous material spill and disposal contingency plan, as identified in the Utilization Plan, which would describe the methods for cleanup and abatement of any petroleum hydrocarbon (including petroleum contaminated soils) or other hazardous material spill.

Table 9: Materials and Chemicals Commonly Used During Well Drilling

Product	Quantity Used	Quantity Stored	Hazardous Material?[1]
Drilling Mud Gel (Bentonite Clay)	200,000 lbs	100 lb sacks on pallets	No
Salt (NaCl)	80,000 lbs	50 lb sacks on pallets	No

Product	Quantity Used	Quantity Stored	Hazardous Material?[1]
Barite (BaSO4)	12,000 lbs	50 lb sacks on pallets	No
Tannathin (Lignite)	2,500 lbs	50 lb sacks on pallets	No
Lime (Calcium Hydroxide)	2,000 lbs	50 lb sacks on pallets	Yes[2]
Caustic Soda (Sodium Hydroxide)	1,000 lbs	50 lb sacks on pallets	Yes[2]
Diesel Fuel	30,000 gals	6,000 gal tank	Yes[3]
Lubricants (Motor Oil, Compressor Oil)	1,000 gals	55 gal drums	Yes[3]
Hydraulic fluid	200 gals	55 gal drums	No
Anti-Freeze (Ethylene Glycol)	100 gals	55 gal drums	No[4]
Liquid Polymer Emulsion (partially hydrolyzed polyacrylamide / polyacrylate (PHPA) copolymer)	100 gals	5 gal buckets	No

1. Hazardous materials are defined and regulated in the United States primarily by laws and regulations administered by the U.S. Environmental Protection Agency (EPA), the U.S. Occupational Safety and Health Administration (OSHA), the U.S. Department of Transportation (DOT), and the U.S. Nuclear Regulatory Commission (NRC). Each has its own definition of a "hazardous material."
2. The material is characteristically hazardous due to its corrosivity
3. The material is characteristically hazardous due to its flammability
4. This material is considered orally toxic following ingestion.

Well workover operations may involve placing a dilute mixture of hydrochloric (muriatic) and hydrofluoric acids down the well, and would only transpire when and if needed. The amount of dilute acid placed in the well bore (which can vary from 10,000 gallons to 50,000 gallons or more) is determined by calculating the amount of each type of mineral to be dissolved. Concentrated (35%) hydrochloric acid and 40% ammonium fluoride solution (to make the hydrofluoric acid) would be delivered via truck to the site on use (i.e. would not be stored onsite during well drilling and testing). The acids are mixed on site with water by experienced contractors. The dilute acid mixture is placed in the cased well bore, followed by water to push the mixture into the geothermal reservoir. After dissolving the minerals in the geothermal reservoir, the water and now spent acids are flowed back through the well to the surface where they are tested, neutralized if necessary (using sodium hydroxide or crushed limestone or marble), and discharged to the reserve pit, which will be sampled prior to reclamation of the pit (see Section 2.1.2).

The project must comply with BLM requirements to ensure that any geothermal fluid encountered during the drilling does not flow uncontrolled to the surface. These include the use of “blow-out” prevention equipment during drilling and the installation of well casing cemented into the ground.

After drilling operations are completed, the liquids from the reserve pits would either naturally evaporate, or be removed as may be necessary to reclaim the reserve pits. The non-hazardous,

non-toxic residual solid contents of the pits would be mixed with the excavated rock and soil and buried by backfilling the reserve pit.

The small quantities of solid wastes (paper trash and garbage) generated by the project would be transported offsite to an appropriate landfill facility. Portable chemical toilet wastes would be removed by a local contractor. Given Ormat's compliance with the associated lease stipulations, no effects would result from solid wastes generated by the project (see also Section 2.1.11). The disposal of these wastes would be a residual impact of the project.

Small quantities of hazardous waste would be generated by construction operations. Typically these wastes would be in the form of empty drums or spent lead acid batteries used for construction equipment. Construction activities typically generate waste oils, oily rags, and oil impregnated absorbent materials used to clean up minor spills from construction equipment. However, most waste generated from the construction activities would be solid (non-hazardous) waste.

Hazardous materials stored on site during normal power plant operations include diesel fuel for the fire pump and standby generator, lubricating oils, and small quantities of paint, antifreeze, cleaning solvents, battery acid, transformer insulating fluid, and laboratory reagent chemicals. Air pollution abatement chemicals and geothermal fluid handling chemicals will also be stored on site. These materials will typically be stored within secondary containment and there will be little potential for adverse effects from spills or releases of these materials.

Substantial quantities of the binary working fluid, pentane, would be stored and used (though not consumed or intentionally released). Pentane is a flammable but non-toxic hydrocarbon similar to, but less volatile than propane. During major maintenance activities on the pentane side of the binary power plant units, the liquid pentane would first be transferred to the pentane storage tank. However, not all of the pentane can be removed in this manner, and the residual pentane would be discharged to the atmosphere when the binary power plant unit is opened. These releases are estimated to average about 12 tons per year.

Small quantities of typical office and industrial trash will be generated during power plant operations. Similar to construction wastes, the operations waste will be removed from the site by a local waste contractor and deposited in an offsite disposal facility authorized to accept the wastes. Sanitary wastes will be handled by a septic system constructed as part of the power plant facilities.

Proper handling, storage and disposal of these hazardous materials, hazardous/regulated wastes and solid wastes in conformance with federal and state regulations would ensure that no soil, ground water, or surface water contamination would occur with any adverse effects on the environment or worker health and safety.

The following mitigation measures are provided to help prevent contamination of soils and reduce the potential for contamination of the reserve pit.

Mitigation Measure:

Absorbent pads or sheets would be placed under likely spill sources.

3.11.2.2 Alternative 1

The impacts of Alternative 1 to Wastes (Hazardous and Solid) would not be different from that of the Proposed Action.

3.12 RANGELAND

3.12.1 Affected Environment

The following is applicable within the Jersey Valley Unit Area (see Table 10):

Table 10: Jersey Valley Unit Area Allotment Information

Allotment	Operator	Season of Use	Use Area	Kind [1]	AUMs	Land Status (acres)
Buffalo Valley	Goemmer L&L Buffalo Ranch, LLC	7/16-9/15 4/15-5/15 5/1-7/15	Jersey Valley LO Jersey Valley LO Jersey Valley HI	C C C	159 20 222	Public: 137,150 Private: 2,730
South Buffalo	Goemmer L&L Buffalo Ranch, LLC	7/16-9/15 4/15-5/15	Jersey Valley LO Jersey Valley LO	C C	903 116	Public: 233,654 Private: 12,039
Jersey Valley	Jersey Valley Cattle Co., LLC	5/1-7/31 [2] 8/1-11/30 [2]	N/A N/A	C C	932 914	Public: 66,711 Private: 1,612

1. Cattle = C
2. Jersey Valley Allotment alternates use every other year. (i.e. Year 1 allotment is used 5/1-7/31; Year 2 allotment is used 8/1-11/30)

The following is applicable within the Buffalo Valley Unit Area (see Table 11):

Table 11: Buffalo Valley Unit Area Allotment Information

Allotment	Operator	Season of Use	Use Area	Kind [1]	AUMs	Land Status: (acres)
Buffalo Valley	Goemmer L&L Buffalo Ranch, LLC	81/-4/30	Buffalo Valley Use Area	C	2,206	Public: 137,150 Private: 2,730
	Ellison Ranching Co.	11/1-4/30	Buffalo Valley Use Area	S	595	
South Buffalo	Goemmer L&L Buffalo Ranch, LLC	8/1-4/30	Buffalo Valley Use Area	C	2,480	Public: 233,654 Private: 12,039

1. Cattle = C; Sheep = S

The following is applicable within the transmission line corridor (see Table 12).

Table 12: Transmission Line Corridor Allotment Information

Allotment	Operator	Season of Use	Use Area	Kind [1]	AUMs	Land Status (acres)
Copper Canyon	Gary Snow Livestock and Grain	11/1-3/31	N/A	S	1,002	Public: 61,607 Private: 45,465
	Chiara Ranch	11/1-2/28	N/A	C	50	
	Ellison Ranching Co.	11/1-4/30	N/A	S	384	
	Badger Ranch	3/1-2/28	N/A	C	3,587	
1. Cattle = C; Sheep = S						

The Buffalo Valley Allotment, South Buffalo Valley Allotment and Jersey Valley Allotment are also within the transmission line corridor (see Table 10 and Table 11).

The Buffalo Valley and South Buffalo Allotments combined comprised 388,639 acres and support 13,135 animal unit months (AUMs) during the year (approximately 30 acres per AUM) (Darrington 2010). An AUM is the amount of forage needed to sustain one cow, five sheep or five goats for a month.

There have been several range improvements within and adjacent to the proposed Project area, primarily, a number of fences exist, as does the Cow Creek Pipeline.

3.12.2 Environmental Consequences

3.12.2.1 Proposed Action

This project could disturb up to 257.84 acres. It would also reduce the 13,135 AUMs within the allotment by 10 AUMs, or less than one percent of the AUMs within the combined allotments. (see Table 13).

Table 13: AUM Reductions in the Buffalo Valley and South Buffalo Allotments

AUM Reductions Buffalo Valley and South Buffalo Allotments				
Allotment	**Operator**	**% of Total AUMs**	**Current AUMs**	**AUM Reduction ***
Buffalo Valley	Goemmer L & L Buffalo Ranch LLC	28%	3,624	2.45 AUMs
	Ellison Ranching Co.	4%	595	0.35 AUMs
South Buffalo	Goemmer L & L Buffalo Ranch LLC	68%	8,916	5.94 AUMs
*** AUMs will be rounded to the appropriate whole number**				

All Project activities are located away from sources of water in the vicinity and will not prevent livestock access to the available sources of water in the area.

To prevent access by cattle to areas which might be harmful to them, Ormat has committed to fence reserve pits and the power plant site in conformance with the Gold Book, and has not proposed any Project activities which would substantially limit livestock's access to the undisturbed portions of the Jersey Valley Unit Area and Buffalo Valley Unit Area.

Due to the small percentage of the allotment's acres lost to direct disturbance, Ormat's fencing of those Project facilities potentially harmful to livestock, and the fact that Project facilities and practices would not prevent continued access by livestock to the undisturbed lands within the Jersey Valley Unit Area, Buffalo Valley Unit Area and along the transmission line corridor, no impacts to range resources are expected.

Ormat's proposed activities are generally located away from the range improvement projects. The transmission line is proposed to cross the Cow Creek Pipeline. Ormat has committed to "span" this pipeline and not place transmission line poles in such a way as to damage the existing pipeline, therefore no impacts to the Cow Creek Pipeline are anticipated.

3.12.2.2 Alternative 1

The construction, operation and maintenance of Alternative 1 would differ from the Proposed Action only by the small increase (0.25 acre) in the total permanent surface disturbance. The impacts of Alternative 1 to Rangeland would not be different from that of the Proposed Action.

3.13 RECREATION

3.13.1 Affected Environment

Known dispersed recreational use within the Jersey Valley Unit Area is evidenced in the soaking facility constructed downstream of the hot springs located in the SW1/4 Section 29, T27N, R40E (see Section 3.9.1). Within the Buffalo Valley Unit Area and transmission line corridor, recreation use is low and mainly associated with dispersed driving for pleasure, hunting, wildlife viewing and OHV use.

3.13.2 Environmental Consequences

3.13.2.1 Proposed Action

The closest project activity within the Jersey Valley Unit Area is well site 17-28 and the associated production pipeline. As these proposed Project components are over 0.25 miles from the soaking facility, no impacts are anticipated.

Project operations should not adversely affect the ability of recreational users to either access or utilize the hot springs within the Jersey Valley Unit Area and Buffalo Valley Unit Area as there

would be no affect on the quality or quantity of the surface or ground waters in the Unit Areas (see Section 3.9.2) or the surrounding environment.

The Project does not propose any activity which would prevent continued access by recreational users to the public lands within the Jersey Valley Unit Area, Buffalo Valley Unit Area and proposed transmission line corridor. Project operations should also not impact the ability of hunters to access previous hunting grounds, or impact the abundance of game animals.

Air quality impacts to recreation users could include dust from vehicle traffic on unpaved roads and exhaust from construction vehicles. As discussed in Section 3.2.2, these would be short-term and temporary. Ormat has also stated that water would be applied to the disturbed ground during the construction activities as necessary to control dust (see Section 2.1.11).

Project-generated noise and traffic could cause some recreational users within the Jersey Valley Unit Area, Buffalo Valley Unit Area and proposed transmission line corridor to stay away during the Project construction and drilling activities. These indirect effects would be temporary and short-term. The Project should have no residual impacts on recreation.

3.13.2.2 Alternative 1

The impacts of Alternative 1 to Recreation would not be different from that of the Proposed Action.

3.14 VISUAL RESOURCES

3.14.1 Affected Environment

The BLM initiated the visual resource management (VRM) process to manage the quality of landscapes on public land and to evaluate the potential impacts to visual resources resulting from development activities. VRM class designations are determined by assessing the scenic value of the landscape, viewer sensitivity to the scenery, and the distance of the viewer to the subject landscape. These management classes identify various permissible levels of landscape alteration, while protecting the overall visual quality of the region. They are divided into four levels (Classes I, II, III, and IV). Class I is the most restrictive and Class IV is the least restrictive (BLM 1986).

The entire Jersey Valley Unit Area, Buffalo Valley Unit Area and proposed transmission line corridor are located in a VRM Class IV area (BLM, MLFO 2006b). The objective of Class IV is to provide for management activities that require major modification of the existing landscape character. The level of change to the characteristic landscape can be high. Management activities may dominate the view and be the major focus of viewer attention. Every attempt, however, should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic landscape elements (BLM 1986).

3.14.2 Environmental Consequences

3.14.2.1 Proposed Action

During the 45-day drilling operations the drill rig may extend up to about 175 feet above ground level. These operations will be 24-hour per day, 7 days per week. During drilling operations, the rig will be visible at distances of greater than one mile from the respective drill sites, and lights used when drilling at night would increase rig visibility. Impacts to visual resources from drilling operations would primarily affect the elements of line and color. Drilling operations will be temporary and short-term. The following mitigation measure is recommended to reduce visual impacts during drilling operations.

Mitigation Measure

All drill rig and well test facility lights would be limited to those required to safely conduct the operations, and would be shielded and/or directed in a manner which focuses direct light to the immediate work area.

Most power plant facilities will be single story and will not be visible at a distance from the power plant site(s). The tallest permanent structure on each power plant site will be the air-cooled condensers estimated to be about 35± feet tall.

Within the transmission line corridor the single poles would be up to 70 feet tall and would be spaced about 300-400 feet apart.

The proposed transmission line generally parallels an existing distribution line or the existing County Road. The transmission line will be visually apparent in the foreground to travelers along the County Road. The transmission line will add an extended linear feature to the landscape.

Project activities would be consistent with the Class IV classification of the area.

The following mitigation measures are recommended to reduce the visual impacts to permanent project related facilities within the Jersey Valley Unit Area and Buffalo Valley Unit Area.

Mitigation Measure

Permanent project facilities within the Jersey Valley Unit Area and Buffalo Valley Unit Area would be painted a color, subject to approval by the authorized officer, which would blend with the landscape (likely covert green). Prior to painting, Ormat would contact the Mount Lewis Field Office project lead.

Permanent project facilities within the Jersey Valley Unit Area and Buffalo Valley Unit Area would be limited to those required to safely conduct the operations, and would be shielded and/or directed in a manner which focuses direct light to the immediate work area.

The following mitigation measure is recommended to reduce the visual impacts from the permanent facilities at the north end of the transmission line corridor.

Mitigation Measure

The substation at the north end of the transmission line corridor would be painted a color, subject to approval by the authorized officer, which would blend with the landscape. Prior to painting, Ormat would contact the Mount Lewis Field Office project lead.

3.14.2.2 Alternative 1

The impacts of Alternative 1 to Visual Resources would not be different from that of the Proposed Action. The mitigation measures proposed under the Proposed Action would be equally applicable for Alternative 1.

3.15 SOCIO-ECONOMIC VALUES

3.15.1 Affected Environment

The closest population center to the project area is Battle Mountain, in Lander County. Adjacent population centers/counties are Lovelock, in Pershing County and Winnemucca, in Humboldt County. Pertinent economic values are provided in Table 14.

Table 14: Economic Values Data

	Total Population	Housing			Labor	
		Units	Occupied (%)	Median Value ($) of owner-occupied	Labor Force	Leading Employers
Pershing County (U.S. Census Bureau 2009a)	6,693	2,389	82.1	82,200	2,478	• Management, professional and related industries (22.7%) • Service occupation (19.9%) • Sales and office industry (18.9%)
Lovelock (U.S. Census Bureau 2009b)	2,003	957	81.8	81,700	917	• Service occupation (25.9%) • Management, professional and related industries (23.2%) • Production, transportation, and material moving occupations (19.9%)
Lander County (U.S. Census Bureau 2009c)	5,794	2,780	75.3	82,400	2,741	• Management, professional and related industries (24.4%) • Construction, extraction, and maintenance occupations (21.7%) • Production, transportation, and material moving occupations (19.1%)

	Total Population	Housing			Labor	
		Units	Occupied (%)	Median Value ($) of owner-occupied	Labor Force	Leading Employers
Battle Mountain CDP (U.S. Census Bureau 2009d)	2,871	1,411	74.6	79,600	1,473	• Management, professional and related industries (22.1%) • Construction, extraction, and maintenance occupations (20.1%) • Production, transportation, and material moving occupations (19.9%)
Humboldt County (U.S. Census Bureau 2009e)	16,106	6,594	83	117,400	7,653	• Management, professional and related industries (25.7%) • Sales and office industry (21.7%) • Construction, extraction, and maintenance occupations (20.5%)
Winnemucca (U.S. Census Bureau 2009f)	7,174	3,319	85	124,000	4,586	• Management, professional and related industries (30.4%) • Sales and office industry (25.0%) • Construction, extraction, and maintenance occupations (14.9%)

3.15.2 Environmental Consequences

3.15.2.1 Proposed Action

Construction of the well field, pipelines and power plant(s) within the Jersey Valley Unit Area and Buffalo Valley Unit Area is expected to require 50 workers and is anticipated to last approximately 12 months. Construction of the transmission line, switching station, and laydown areas is expected to consist of 25-30 workers and is anticipated to last approximately 6 months. Some of these workers would be recruited locally, though most would be specialized workers from outside of the local area. Typically, non-local skilled workers do not bring families with them on these construction assignments. Therefore, most are expected to stay in local hotels or rental housing units.

Non-local construction workers typically are paid a *per diem* rate for daily housing and meal costs. Workers normally spend the *per diem* on motel accommodations or RV campground space rent, restaurants, groceries, gasoline, and entertainment. In addition, Ormat likely would purchase or rent some portion of the equipment and supplies required to drill and complete the construction activities (such as grading equipment, fuel and tools) from local suppliers. This spending activity associated with the construction of the Project(s) would have a small but positive effect on local businesses in Pershing and Lander Counties.

Operation of the project is expected to require 20 workers, and would not induce population growth in an area. Neither do the proposed Project(s) create or provide any infrastructure which would indirectly induce substantial population growth.

3.15.2.2 Alternative 1

The impacts to Socio-economic values of Alternative 1 would be the same as those described for the Proposed Action.

3.16 LAND USE AUTHORIZATIONS

3.16.1 Affected Environment

Several rights-of-way (ROWs) have been granted by the BLM on the public lands within the Jersey Valley Unit Area, Buffalo Valley Unit Area and transmission line corridor (see Table 15), and generally consist of ROWs for power lines, telephone lines, access roads, and pipelines (BLM 2008c). Additionally, a public water reserve (PWR 107) and several authorizations for fences and a pipeline are located within the Jersey Valley Unit Area.

Table 15: Land Use Authorizations within the Jersey Valley Unit Area, Buffalo Valley Unit Area and Transmission Line Corridor

Holder	ROW/Activity	Case File No.	Location
Nevada Bell	Telephone ROW/ Fiber Optic Line	NVCC-0021089	27N 40E, sec 3, 16, & 20 28N 40E, sec 13, 23, 24, 26, & 35 28N 41E, sec. 2, 3, 8, 9, 17, & 18 29N 41E, sec. 24, 25, 26, 34, & 35 29N 42E, sec. 3, 4, 8, 9, 17, 18, & 19 30N 42E, sec. 24, 26, 27, & 34 30N 43E, sec. 10, 16, & 20
AT&T	Telephone ROW	NVN-46266	27N 40E, sec 3 & 20 28N 40E, sec. 13, 23, 24, & 26 28N 41E, sec. 2, 3, 8, 9, 17, & 18 29N 41E, sec. 24, 25, 26, & 35 29N 42E, sec. 4, 8, 9, 17, 18, & 19 30N 42E, sec. 24, 26, 27, & 34 30N 43E, sec. 10, 11, 16, & 17
Ormat Nevada Inc.	Road ROW	NVN-82304	27N 40E, sec. 21, 22, & 27
Barbara and Mike Stremler	Temporary Water Pipeline ROW	NVN-85141	27N 40E, sec. 29
Deborah & Jerry Kelly	FLPMA sec 302 Permit	NVN-44630	28N 41E, sec. 9 30N 43E, sec. 16
Sierra Pacific Power	Power Line ROW	NVN-57376	28N 41E, sec. 3 & 9 29N 41E, sec 24, 25, 26, 34 & 35 29N 42E, sec. 3, 4, 8, 9, 17, 18, & 19 30N 42E, sec. 24, 26, 27, & 34 30N 43E, sec. 10, 16, & 20

Holder	ROW/Activity	Case File No.	Location
Sierra Pacific Power	Power Line ROW	NVN-0056560	28N 41E, sec 9
Nevada Bell	Telephone ROW	NVN-1608	30N 42E, sec. 24, 25, & 26 30N 43E, sec.16, 17, & 20
Sierra Pacific Power	Power Line ROW	NVN-00051984	30N 42E, sec. 26
Nevada Bell	Telephone ROW	NVN-0005640	30N 42E, sec. 26
American Tower Corp	Communication Site ROW	NVN-0057070	30N 42E, sec. 24
Lander County	Road ROW	NVN-48143	30N 43E, sec. 16
Sierra Pacific Power	Power Line ROW	NVN-48871	30N 43E, sec. 20
Newmont Expl. Ltd.	Power Line ROW	NVN-78954	30N 43E, sec. 16, 17, & 20
Newmont USA Ltd. Dba NMC	Road ROW	NVN-80925	30N 43E, sec. 10
Southwest Gas Corp.	Oil & Gas Pipeline ROW	NVN-0065084	30N 43E, sec. 10 & 11
Nevada Bell	Telephone ROW	NVN-0066582	30N 43E, sec. 10

3.16.2 Environmental Consequences

3.16.2.1 Proposed Action

All project activities within the Jersey Valley Unit Area and the Buffalo Valley Unit Area are located away from the authorized ROWs, so there would be no impacts to lands and realty within the geothermal operations area.

Transmission line poles would not be located within any existing ROWs and no impacts are expected. The transmission line wires would pass over several land use authorizations, but would not interfere with any existing ROWs. No impacts are anticipated.

3.16.3.2 Alternative 1

The impacts to lands and realty from Alternative 1 would be identical to those described for the Proposed Action.

4 CUMULATIVE EFFECTS

The CEQ regulations for implementing NEPA (40 CFR 1508.7) define cumulative impacts as:

". . . the impact on the environment which results from the incremental impact of the action when added to other past, present, or reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

4.1 CUMULATIVE EFFECTS STUDY AREA

The cumulative effects study area (CESA) is the approximately 407,360 acre area which was determined on a hydrologic and topographical basis (see Figure 23).

4.2. PAST AND PRESENT ACTIONS

Past and present actions consist primarily of livestock grazing, recreational activities, transportation and access, wildfires, wild horse and burro use (including wild horse gathers), mineral exploration and geothermal exploration activities.

Livestock grazing – Portions of seven BLM-managed grazing allotments are within the CESA: North Buffalo, South Buffalo, Jersey Valley, Home Station Gap, Pumpernickel, Copper Canyon, Cottonwood and Carico Lake (BLM, NV 2005). In order to support the management of these allotments, a variety of range improvement projects have been implemented through the years, including fences, cattleguards and wells.

Recreational activities – Dispersed recreation occurs within the CESA and includes off-highway vehicle (OHV) use, wildlife viewing and hunting.

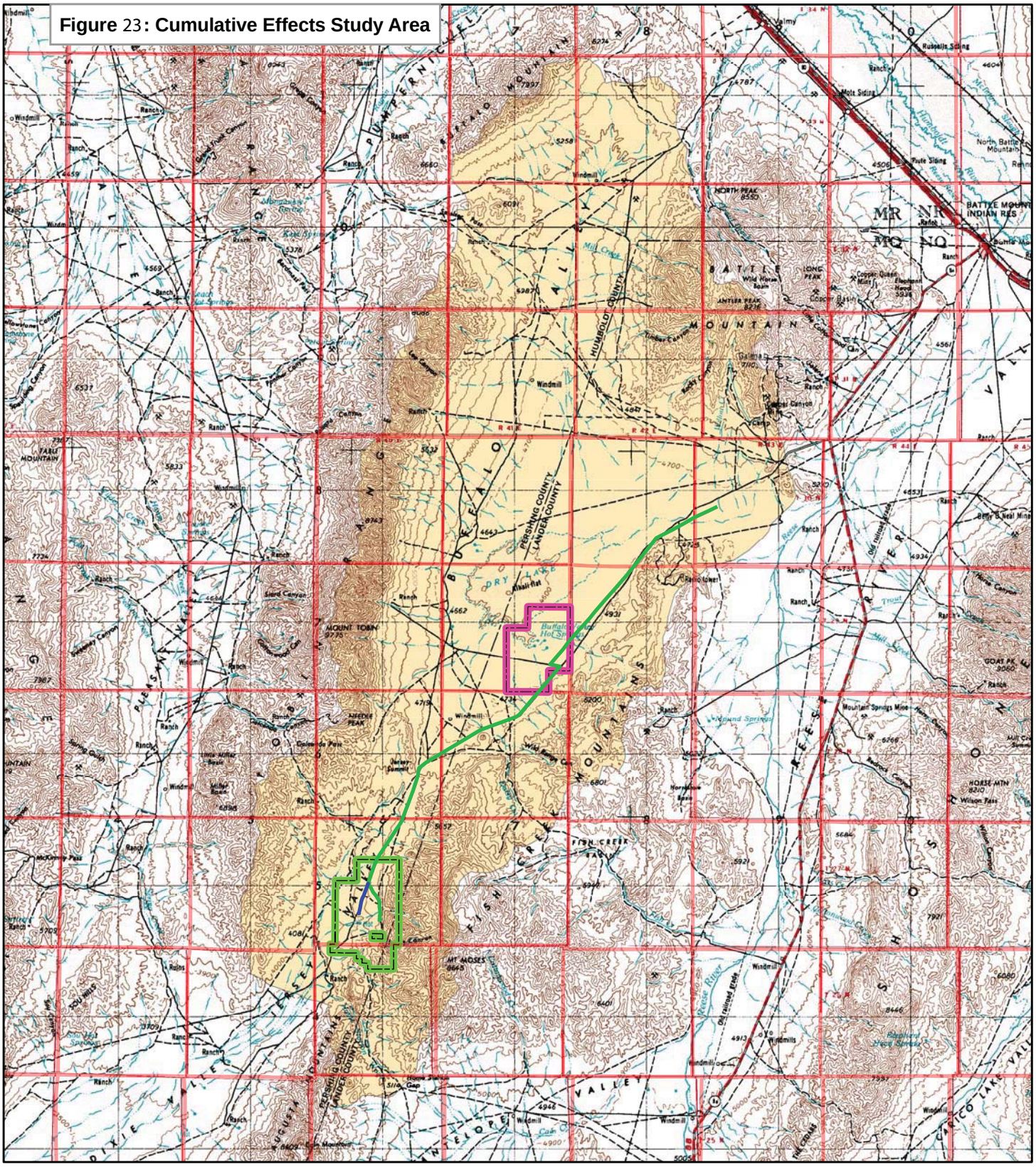
Transportation and access – Past and present actions within the CESA are supported by a transportation system which includes gravel County Roads, BLM Roads, and dirt roads or "two-tracks" on public lands. Few are regularly maintained.

Wildfires – Within the past decade there have been seven wildfires within the CESA: two unnamed fires (1999 and 2000), the Gooseberry Fire (2001), Smelser Pass Fire (2006), Cottonwood Fire (2006), the Buffalo Ranch Fire (2006) and the Horse Fire (2007) (BLM, MLFO 2006a).

Wild Horse and Burro Use – Portions of two BLM-managed Herd Management Areas (HMAs) are within the CESA: Tobin Range HMA and the Augusta Mountains HMA (BLM, NV 2007).

Mineral exploration – Hundreds of active mining claims exist within the CESA.

Figure 23: Cumulative Effects Study Area



LEGEND

- 120 kV Power ROW - Proposed
- 120 kV Power ROW - Alternative
- Buffalo Valley Geothermal Unit Area (NVN-838484X)
- Jersey Valley Geothermal Unit Area (NVN-83483X)
- Cumulative Effects Study Area

0 3 6 12 Miles

United States Department of the Interior

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"No warranty is made by the Bureau of Land Management as to the accurracy, reliability, or completeness of these data for individual use or aggregate use with other data.

The data shown on the map uses the Universal Transmercator (Zone 11N) Coordinate system and uses the NAD83 projection.

Map Date: November 3, 2009

N W E S

Geothermal exploration – Ormat has conducted geothermal temperature gradient hole and geothermal observation well drill activities within the Jersey Valley Geothermal Unit and the Buffalo Valley Geothermal Unit (see Section 1.1).

4.3 REASONABLY FORESEEABLE FUTURE ACTIONS

The past and present actions identified above are expected to persist in the same manner and to the same degree as they have been conducted in the present and recent past.

Other reasonably foreseeable future actions (RFFAs) include a pending FLPMA land sale (NVN-78534), pending access road ROW (NVN-84251) and a pending Plan of Operations (NVN-81365).

Land Sale – a FLPMA land sale (NVN-78534) is pending. The proponent of the land sale is Buffalo Valley Farms. The sale involves approximately 7,370.09 acres located within Sections 1-3, T.30N. R.40E. and Sections 11, 14, 15, 22, 23, 25-27, 34, and 35, T.31N. R.41E. This land sale has been pending since April 2004.

Access Road ROW – an access road ROW (NVN-84251) is pending. The proponent is the Lander County Public Works Department. The ROW is approximately 4.470 acres and would be located at Sections 6 and 18, T.30N. R.43E.; and Section 32, T.31E. R.43E. This access road ROW has been pending since October 2007.

Plan of Operations – a mining Plan of Operations (NVN-81365) is pending. The proponent is Independence Gold. The Plan of Operations involves 50 acres of surface disturbance and is located at Section 33, T.31N. R.43E. This Plan of Operations has been pending since December 2005.

Mining – the BLM has been apprised of a potential hard rock mine development located in the CESA. This mine is anticipated to be approximately 900 acres in size (all facilities); currently is not planned for dewatering of the pit; and has a potential mine life of ten (10) plus years.

4.4 CUMULATIVE EFFECTS FOR THE PROPOSED ACTION

4.4.1 Air Quality

Past and present actions have generated fugitive dust, principally from surface disturbing activities and travel on unpaved roads. Reasonably foreseeable future actions are expected to add to these fugitive dust emissions, although the increases could vary depending on a variety of factors.

Fugitive dust would be generated by the proposed action but mitigated by implementation of environmental protection measures specified by Ormat and the best practical dust control measures specified in the NDEP-BAPC Surface Area Disturbance Permit. As a result, the potential for cumulative impacts from the proposed action are minimal.

4.4.3 Cultural Resources

Impacts to the integrity of setting of any subsequently identified National Register listed/eligible sites where integrity of setting is critical to their listing/eligibility could occur from mineral exploration, a wind farm and geothermal development activities. Construction activities could increase the likelihood of vandalism of cultural sites.

Effects to cultural resources could be prevented by site avoidance and by prosecuting offenses under the Archaeological Resources Protection Act. In some cases archaeological monitors (archaeologists permitted by Nevada BLM) may be required by the BLM to ensure that sites are avoided by the project activities. If all sites that are determined eligible for inclusion on the NRHP are avoided, and sites whose NRHP status is unevaluated are also avoided, then this project will have no effect to historic properties and the cumulative effect will be negligible.

4.4.3 Native American Religious Concerns

Over the last 15 to 20 years, BLM and the tribes have witnessed an increase in the use of lands administered by BLM, by various groups, organizations, and individuals. New ways to utilize the public lands are also on the rise. Livestock grazing, pursuit of recreation opportunities, hunting/fishing, Oil, Gas, Geothermal, and Mining leasing, exploration and development, along with relatively "newer" uses such as OHV use, interpretive trails, and mountain biking are among many increasing activities within the BLM MLFO administrative boundary. In addition to all the existing, growing, and developing uses of the public lands, fluid mineral leasing, exploration and development would continue to contribute to the general decline in sites and associated activities of a cultural, traditional, and spiritual nature.

It is believed that cultural resources, including tribal resources and sites of cultural, traditional, spiritual use and associated activities are increasingly in danger of losing their physical and spiritual integrity. At one time central and northern Nevada contained some of the more remote and undeveloped locations in the Great Basin. However, as populations grow, public interest in utilizing lands administered by the BLM increases and thus the potential for the decline of culturally sensitive areas also increases. Diverse world views, social and spiritual practices, economic and employment pursuits, resource utilization, and traditions and beliefs often conflict with each other. Because traditional lands encompass the majority of the State of Nevada including the BLM Mount Lewis administrative area, it is imperative that BLM and affected Tribes remain flexible and open to productive and proactive communication in order to assist each other in making decisions that will significantly reduce or eliminate any adverse affects to all party's interests, resources, and/or activities.

4.4.4 Wildlife (Including Threatened and Endangered Species, Special Status Species and Migratory Birds)

Additional wildlife habitat could be disturbed by the additional mineral exploration activities and activities proposed under the Plan of Operations and through the creation of roads and other surface disturbing activities associated with the RFFAs. Wildlife habitat directly disturbed by

these activities would be "lost" until reclaimed. General human activity and generated noise could also keep some animals away from habitat not directly affected by surface disturbance. The amount of this direct and indirect surface disturbance expected from the cumulative projects is a small portion of the CESA. There is comparable wildlife habitat in the vicinity and region, and wildlife should be able to move away from small areas of direct disturbance and into adjacent suitable habitat. Reclamation of disturbed areas, as proposed by the Project(s), could reestablish habitat for wildlife.

Threatened and Endangered Species

As the proposed Project(s) would have no effect on threatened and endangered species, there would be no cumulative impacts.

Special Status Species

The activities associated with the RFFAs would not be allowed in areas where there would be a negative impact on special status species. Implementation of mitigation measures, as identified for the proposed Project(s), could help to reduce the potential for adverse effects if also implemented for the other actions.

Migratory Birds

The amount of surface disturbance which may be created within the CESA by the RFFAs would be a very small portion of the CESA. Mitigation measure(s) requiring inventories for migratory bird nests and limiting ground disturbing activities, if conducted during the migratory bird nesting season, would help to reduce the potential adverse effects if also implemented for the other actions.

4.4.5 Invasive, Nonnative Species

Past and present actions may and have the potential to introduce and contribute to the spread of noxious weeds, invasive and nonnative species (seed and vegetative plant parts) within the CESA, and the same may be expected from the RFFAs. Ongoing mineral exploration activities would cause the most extensive surface disturbance and would present the greatest opportunity for noxious weed, invasive and nonnative species introduction and proliferation. The number and size of construction vehicles and construction activities could lend themselves to transporting noxious weeds, invasive and nonnative species (seed and vegetative plant parts) to areas where they had not previously existed.

Mitigation measures include the inventory and treatment of newly disturbed areas and the washing of construction vehicles and workers' boots to help reduce the potential effects. Additionally, impacts would be reduced when reclamation (reseeding/re-vegetation) activities commence.

4.4.6 Soils

Additional impacts to soils could be expected to occur from additional mineral exploration and other activities within the CESA. Additional roads could be constructed and mineral exploration holes drilled. Each of these activities would disturb the soils in the affected areas, which would be "lost" until reclaimed following completion of the Projects. Mitigation measure(s) requiring the salvaging of topsoil could help reduce the potential effects if implemented for the other actions.

4.4.7 Vegetation

Each of the cumulative activities would disturb and/or remove vegetation in the CESA. Mitigation measure(s) requiring timely reclamation and re-seeding of disturbed areas, as proposed by the Project, would reduce impacts to vegetation. The contribution of the proposed Project to these cumulative effects on vegetation would be minimal.

4.4.8 Water Quality and Quantity

Impacts to water quality could be expected to occur from additional mineral exploration and other activities within the CESA. Additional roads could be constructed and mineral exploration holes drilled. Each of these activities would have the potential to degrade surface water quality in the affected areas, although measures requiring the implementation of best management practices for erosion and sedimentation could help reduce the potential effects if implemented for the other actions. None of the past, present or reasonably foreseeable future actions would add any potential for impacts to the hot springs identified for the Proposed Action.

4.4.9 Wastes (Hazardous and Solid)

The transportation, use, storage and disposal of hazardous materials and wastes are subject to numerous federal, state and local laws and regulations which are intended to protect the public and the environment, and which are applicable to all of these past, present and RFFAs.

Hazardous materials are expected to be used by both the mineral exploration and activities proposed under the Plan of Operations project, including petroleum fuels (principally diesel fuel), hydraulic fluid, lubricants and drilling chemicals and materials. Additional non-hazardous solid waste and liquids would also be generated by the reasonably foreseeable future projects.

Proper handling, storage and disposal of the proposed action hazardous materials, hazardous wastes and solid wastes in conformance with federal and state regulations would ensure that no soil, ground water or surface water contamination would occur from the proposed action. Thus, the potential for cumulative impacts from the hazardous or solid wastes produced by the proposed action would be minimal.

4.4.10 Rangeland

Primary impacts that could occur from the RFFAs would be cumulative increases in vegetation and soil disturbances, which could result in incremental losses in the availability of grazing used for livestock. Some of this reduction in forage would be temporary, until reclaimed, though some could be longer term. No cumulative activities are expected to prevent livestock access to available sources of water in the area.

The amount of surface disturbance which could impact livestock habitat constitutes a small percentage of the grazing allotments. Effects of potential proposed actions on livestock populations would be analyzed and mitigation measures developed to reduce impacts, or restrictions developed to protect livestock. The contribution of the proposed Projects to these cumulative effects on grazing management would be minimal. Additionally, impacts would be reduced when reclamation activities commence.

4.4.11 Recreation

The mineral exploration and activities conducted under the Plan of Operations would prevent continued access by recreational users to some of the public lands within the CESA.

Fugitive dust from vehicle traffic on unpaved roads, as well as noise and traffic from cumulative activities, could cause some recreational users to avoid those active portions of the area during the cumulative project construction and operational activities. The contribution of the proposed Project to these indirect cumulative effects on recreation would be minimal.

4.4.12 Visual Resources

The CESA is rated as VRM Class IV (modification). Construction activities associated with the mineral exploration and other RFFAs would result in long-term modifications to the line, form, color, and texture of the characteristic landscape. The creation of roads create strong horizontal linear contrasts. Vegetation and soil removal create color, textural, and linear contrasts with adjacent areas that could be visible long after all the facilities were removed. Constructed structures would have strong geometric and linear shapes, and solid colors, all contrasting with the natural landscapes and continuing throughout the life of the projects.

All of these contrasts could be mitigated on a case-by-case basis in order to maintain the area consistent with VRM Class IV. Project components could be sited and/or colored to blend in with the natural and existing horizontal features of the landscape. Disturbed areas could be revegetated to minimize the contrasts. Larger structures could be painted with colors that would blend in with the surrounding landscape.

The contribution of the proposed Projects to these cumulative effects on visual resources would be minimal.

4.4.13 Socio-Economic Values

Past and present activities have had a generally positive economic impact. Generally positive economic impacts would also be expected from the RFFAs, as some of the construction and operation activities would be contracted out to local contractors and builders, and some of the required supplies and construction materials could also be purchased from local merchants. Some positive economic impacts could also be realized from the rental of hotel rooms and purchase of meals and entertainment by construction workers.

The contribution of the proposed action to these cumulative effects on socioeconomic values would be minimal to moderate.

4.4.14 Land use Authorizations

Granting of new rights-of-way for non-geothermal development would need to take into consideration existing geothermal leases and mineral claims. No other impacts to land use or realty are expected to occur.

5 COORDINATION AND CONSULTATION

5.1 LIST OF PREPARERS

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Appendix A: Geothermal Lease Stipulations

NVN-77483

BLM WINNEMUCCA FIELD OFFICE GEOTHERMAL LEASE STIPULATION FOR SPECIAL STATUS SPECIES

Penstemon palmerii var. macranthus, and Lahontan beardstongue, both special status plant species (T&E/Sensitive) have been identified in the vicinity lands contained in this lease. The lease lands contain similar habitat and associated plant species. Prior to approval of ground disturbing activities, the lessee shall contact the BLM to coordinate the need for a field inventory to determine the presence of this species. If these plant species are identified in the area of proposed surface disturbing activities, then the Winnemucca Field Office Geothermal Lease Stipulations for Threatened, Endangered or Sensitive Species will apply.

Signature of Lessee
DANIEL SCHOCHET
VICE PRESIDENT

June 30, 2005
Date

RECEIVED
Bur. of Land Management
9:00 A.M. JUL 0 1 2005
NEVADA STATE OFFICE
RENO, NEVADA

NVN-77483

BLM WINNEMUCCA FIELD OFFICE GEOTHERMAL LEASE STIPULATION FOR BATS

Two species of bats, the Pallid bat (*Antrozous pallidus*) and Townsend's big-eared bat (*Corynorhinus townsendii*) use adits located within secs. 27 and 34, T. 27 N., R. 40 E., MDM, Nevada. The lease will be subject to the following protection measures:

a) The No Surface Occupancy restriction will apply to a 0.25-mile radius around the openings of adits occupied by these bats.
b) Caution should be used to avoid coming in contact with any of the adits during drilling.
c) Personnel should be cautioned to avoid entering the 0.25-mile radius around the openings of adits occupied by these bats.

Signature of Lessee
DANIEL SCHOCHET
VICE PRESIDENT

June 30, 2005
Date

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Bur. of Land Management
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NEVADA STATE OFFICE
RENO, NEVADA

NVN-77483

BLM WINNEMUCCA FIELD OFFICE
GEOTHERMAL LEASE STIPULATIONS

Noncompetitive areas and all Known Geothermal Resource Areas (KGRA) will be open to geothermal leasing with the following restrictions:

Sage grouse: The following stipulations apply to protect sage grouse and their habitat. Known habitat is defined as those areas where sage grouse have been observed. Potential habitat is an areas where sage grouse may occur. **Known Breeding habitat and Leks:** February through June, but may vary on site specific basis. Avoid all activity within 3.3 km. (2 miles) of known leks during the mating season - March through May, or as determined by Field Office and Wildlife Personnel. No surface occupancy within 3.3 km (2 miles) of known leks at all times. **Nesting Habitat and Brood-rearing habitats:** (April through August per Interim NV Guidelines) and Winter Habitats: (October through March). **Known Habitat:** Avoid all development or exploration activities within 3.3 km (2 miles) or other appropriate distance based on site-specific conditions, of leks, or within 1 km. (0.6 mi.) of known nesting, brood-rearing and winter habitat. **Potential Habitat:** Avoid permanent occupancy of potential habitat.

General Sage Grouse Stipulations: Prior to entry on any lease areas which include known or potential habitat, the lessee (operator) shall contact the appropriate BLM Field Office to discuss any proposed activities.

Controlled Or Limited Surface Use: (avoidance and/or required mitigation measures to be developed) – Are applicable for all leases proposed in areas of crucial deer, antelope, and big horn sheep habitat during migration and critical fawning and kidding areas.

Other Biota: Prior to site development, a survey for invertebrates will be conducted on areas where geothermal surface expressions occur.

Threatened, Endangered or Sensitive Species:
No surface occupancy: No surface occupancy within 1 mile of occupied or identified potential Lahontan Cutthroat Trout (LCT) habitat.
Controlled Or Limited Surface Use: (avoidance and/or mitigation measures to be developed) The lease area may now or hereafter contain plants, animals, or their habitats determined to be threatened, endangered, or other special status species. BLM may recommend modifications to exploration and development proposals to further its conservation and management objective to avoid BLM-approved activity that will contribute to a need to list such a species or their habitat. BLM may require modifications to or disapprove proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modifications of a designated or proposed critical habitat. BLM will not approve any ground-disturbing activity that may affect any such species or critical habitat until it completes its obligations under applicable requirements of the Endangered Species Act, 16 U.S.C. 1531, as amended, including completion of any required procedure for conference or consultation.

Wild Horse and Burros:
Controlled or Limited Surface Use: (avoidance and/or mitigation measures to be developed.) If wild horse or burro populations are located on sites proposed for development, it may be necessary to avoid or develop mitigation measures to reduce adverse impacts to horses. These measures may include providing alternative water sources for horses of equal quality and quantity.

Migratory Birds: Surface disturbing activities during the migratory bird nesting season (March to July) may be restricted in order to avoid potential violation of the Migratory Bird Act. Appropriate inventories of migratory birds shall be conducted during analysis of actual site development. If active nests are located, the proponent shall coordinate with BLM to establish appropriate protection measures for the nesting sites which may include avoidance or restricting or excluding development during certain areas to times when nests and nesting birds will not be disturbed. During development and production phases, if artificial ponds potentially detrimental to migratory birds are created, these shall be fitted with exclusion devices such as netting or floating balls.

Vegetation
Controlled Or Limited Surface Use: (avoidance and/or mitigation measures to be developed). All areas of exploration and or development disturbance will be reclaimed including re-contouring disturbed areas to blend with the surrounding topography and using appropriate methods to seed with a diverse perennial seed mix. The seed mix used to reclaim disturbed areas would be "certified" weed free.
Riparian Areas: No surface occupancy within 650 feet (horizontal measurement) of any surface water bodies, riparian areas, wetlands, playas or 100-year floodplains to protect the integrity of these resources (as indicated by the presence of riparian vegetation and not actual water). Exceptions to this restriction may be considered on a case-by-case basis if the BLM determines at least one of the following conditions apply: 1) additional development is proposed in an area where current development has shown no adverse impacts, 2) suitable off-site mitigation will be provided if habitat loss is expected, or 3) BLM determines development proposed under any plan of operations ensures adequate protection of the resources.
Noxious Weeds: During all phases of exploration and development, the lessee shall maintain a noxious weed control program consisting of monitoring and eradication for species listed on the Nevada Designated Noxious Weed List (NRS 555.010).

Cultural Resources
No surface occupancy: No surface occupancy within the setting of National Register eligible sites where integrity of setting is critical to their eligibility.
Controlled Or Limited Surface Use: (avoidance and/or mitigation measures to be developed). All surface disturbing activities proposed after issuance of the lease are subject to compliance with Section 106 of the National Historic Protection Act (NHPA) and it's implementation through the protocol between the BLM Nevada State Director and the Nevada State Historic Preservation Officer.

Native American
No surface occupancy: No surface occupancy within the setting of National Register eligible Traditional Cultural Properties (TCPs) where integrity of the setting is critical to their eligibility. For development and production phases, surface occupancy may be limited to a specific distance

or precluded at hot springs, pending conclusion of the Native American consultation process. All development activities proposed under the authority of this lease are subject to the requirement for Native American consultation prior to BLM authorizing the activity. Depending on the nature of the lease developments being proposed and the resources of concerns to tribes potentially effected, Native American consultation and resulting mitigation measures to avoid significant impacts may extend time frames for processing authorizations for development activities, as well as, change in the ways in which developments are implemented.

Paleontological Resources
Where significant paleontological resources are identified, mitigating measures such as data recovery, restrictions on development, and deletion of some areas from development may be required on a case by case basis.

Water Resources
As exploration and development activities commence, the operator shall institute a hydrologic monitoring program. The details of the monitoring programs will be site specific and the intensity shall be commensurate with the level of exploration. For example, if the proponent will be conducting seismic studies the monitoring would be limited to the identification of water resources to be monitored as activities continue; if a drilling program were to be undertaken the number of aquifers encountered, their properties, their quality, and their saturated thickness would be documented. The information collected will be submitted to the Bureau of Land Management and will be used to support future NEPA documentation as development progresses. Adverse impacts to surface expressions of the geothermal reservoir (hot springs), and Threatened and Endangered Species habitat are not acceptable. The lessee will monitor the quality, quantity, and temperature of any hot springs or other water resource within the project area whenever they are conducting activities which have the potential to impact those resources. If adverse impacts do occur, BLM will require the lessee to take corrective action to mitigate the impact. Corrective action may include shutting down the operation. These are in addition to the other stipulations. These are LEASE stipulations, not operational, the information gathered under the monitoring stipulation will be used to identify future impacts at the operational stage.

Lands & Realty
No drilling, including exploration or development activities within linear Rights-of-Way

Hazardous Materials
Prior to exploration and development, an emergency response plan will be developed to include contingencies for hazardous material spills and disposal.

Signature of Lessee
DANIEL SCHOCHET
VICE PRESIDENT

June 30, 2005
Date

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Bur. of Land Management
9:00 A.M. JUL 0 1 2005
NEVADA STATE OFFICE
RENO, NEVADA

NVN-77483

Stipulations to be applied to the portion of Geothermal Lease Application NVN-77483 located in the Shoshone-Eureka Planning Area of the Battle Mountain Field Office.

	The operator would be required to implement at the direction of the Assistant Field Manager testing of emissions for H2S and other noxious / deadly gases where there is indication that these gases may occur.
	Cultural resources would be avoided and mitigation measures would be developed on a case-by-case basis as required by regulations, lease terms and attached stipulations developed during site specific NEPA analysis.
	As surface disturbing activities occur, the BLM would require that the operator monitor the water temperature and outflow of water from local hot springs and existing wells as directed by the Assistant Field Manager. If the temperature and outflow of the water from the spring or well were impacted to a degree determined by the Assistant Field Manager to be more than negligible, the BLM would require the operator to take corrective actions. Failure of the operator to take the corrective measures as directed could result in BLM's terminating the operation.
	The lease area may now or hereafter contain plants, animals, or their habitats determined to be threatened, endangered, or other special status species. The special status species list is reviewed and / or updated annually and as species are added, new mitigations / stipulations may add further restrictions. BLM may recommend modifications to exploration and development proposals to further its conservation and management objective to avoid BLM-approved activity that will contribute to a need to list such a species or their habitat. BLM may require modifications to or disapprove proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modification of a designated or proposed critical habitat. BLM will not approve any ground-disturbing activity that may affect any such species or critical habitat until it completes its obligations under applicable requirements of the Endangered Species Act as amended, 16 U.S.C. § 1531 et seq., including completion of any required procedure for conference or consultation. Exploratory endeavors on the public lands would require a Special Status Species review, and may require a field survey for the presence of Special Status Species. Potential impacts to Special Status Species would be analyzed on a case-by-case basis. Mitigation measures would be developed on an individual project basis depending upon the results of the survey. Springs within ½ mile of exploration activities would be inventoried

	by BLM approved and supervised personnel for the presence of invertebrates. If a rare genus, such as Pyrgulopsis, is found, identification to species and monitoring of effects of the proposed action would be required and site-specific mitigation may be developed by the BLM. BLM could require measures listed below for activities in sage grouse and ferruginous hawk habitat. Sage grouse: Operations would avoid active leks (strutting grounds) by 2 miles during strutting season (see Management Guidelines for Sage Grouse and Sagebrush Ecosystems in Nevada, October 2000). Approximate dates: March 1 - May 15 Operations would avoid nesting and brood rearing habitat (especially riparian habitat where broods concentrate beginning usually in June) by ½ mile during the time such areas are in use. Approximate dates: April 1 - August 15 Operations would avoid sage grouse wintering habitat by ½ mile while occupied. Most known wintering grounds in the Shoshone-Eureka Resource Area occur at high elevations and are not likely to be affected. Avoidance dates would vary with severity of the winter. BLM would limit the disturbance to and fragmentation of all known sage grouse habitat. Ferruginous hawks: Operations would avoid active nests by ½ mile. Approximate dates: March 15 - July 1

	All applicants for exploration permits would be required to submit a surface water inventory to the Assistant Field Manager before authorization would be granted. The inventory would include a map of appropriate scale (such as 1:24,000) indicating the location of all surface water on public land within ½ mile radius from the surface-disturbing activity. At the commencement of surface disturbing activities for the drilling of exploration wells, the BLM would require that the drilling company monitor the water temperature and / or outflow of water from local springs and existing wells as directed by the Assistant Field Manager. If the temperature and outflow of the water from the spring or well were impacted to a degree determined by the Assistant Field Manager to be more than negligible, the BLM would require the operator to take corrective actions. Failure of the operator to take the corrective measures as directed could result in BLM's terminating the operation. Results would be reported to Federal and State agencies on the status of these hydrologic systems during drilling. Impacts include, but are not limited to, the following: Change in water temperature Change in discharge rate Substantial decrease in water table level Surface subsidence In the event of impacts to surface or subsurface waters, determined by the Assistant Field Manager to be more than negligible, or if a violation of Federal or State water quality standards occurs, the Assistant Field Manager would assess the situation, and may require the operator to amend, relocate or discontinue operations. If operations were terminated, the BLM would develop and the operator would implement remediation measures. Typical measures include: No use of the surface water; Limitations on the type of equipment that may be used; and Restrictions of activities during certain times of the year.
	Surface waters, wetlands and riparian areas would be avoided as much as possible. No exploration activities should occur within 100 feet of riparian areas. The NOTICE OF INTENT TO CONDUCT GEOTHERMAL RESOURCE EXPLORATION OPERATIONS (Form 3200-9), terms and conditions, number 10 states that "Vegetation shall not be disturbed within 300 feet of waters designated by the Authorized Officer, except at approved stream crossing." Where surface waters, wetlands and riparian areas cannot be avoided (100 feet for non-surface disturbing exploration activities and 300 feet for surface disturbing exploration activities), mitigation would be developed on a case-by-case basis.

RECEIVED
Bur. of Land Management
9:00 A.M. JUL 0 1 2005
NEVADA STATE OFFICE
RENO, NEVADA

	Typical measures include: No use of the surface water; Limitations on the type of equipment that may be used; and Restrictions of activities during certain times of the year. The BLM would require that the drilling company monitor the temperature and outflow of water from local hot springs. If the temperature and / or outflow of water from a spring were impacted to a degree determined by the Assistant Field Manager to be more than negligible, the BLM would require the operator to take corrective action. Failure of the operator to take the corrective measures as directed could result in BLM's terminating the operation.
	Areas to be involved in surface disturbing activities would be inventoried for the presence of invasive, nonnative species and treated if present. The exterior of all vehicles and heavy equipment would be cleaned by water before entering public lands to do work. To minimize the possibility for contamination, a designated wash area would be designated by the BLM and would be established and monitored by the operator in high use areas. The boots of operators and other persons working in the areas would be cleaned of seed before coming onto BLM lands. The BLM would develop and the operator would implement a weed treatment program from the time operation commences until the site is abandoned. Seed and mulch used to reclaim disturbed areas would be free of invasive nonnative species. Operator and workers would driving through or parking in areas where invasive nonnative species occur. When sites are abandoned, they would be inventoried for the presence of invasive nonnative species and treated if present.
	Avoid existing rights-of-way where possible. Proposed leases would not be allowed to overlap existing land use authorizations if they would adversely affect the valid existing authorization.
	If operations cause a water source to become unavailable to livestock, the Authorized Officer may require a new well to be drilled, or another water development to be constructed in the general area to provide adequate water for livestock. If the lease area is within a grazing allotment, the Assistant Field Manager may require additional measures, including seasonal restrictions or no surface occupancy.
	None identified.
	None identified.

	Disturbed areas would be reseeded with native or introduced plant species, depending on the site conditions. Disturbed areas would be reseeded with pure live seed (certified weed free) with the mixes in Appendix F. Native vegetation would be used wherever possible. However, to compete with invasive nonnative species, introduced species, as suggested in the seed list in Appendix F, would be used.
	None identified.
	The BLM would limit the amount of ground clearing or other disturbance (such as the creation of cross-country access to drill sites) that an operator may do during the migratory bird nesting season. Areas to be disturbed would be surveyed, by personnel approved and supervised by the BLM to determine the existence and location of any nests. If any nests were located, the nest would be avoided by ¼ mile. If the nest area cannot be avoided, mitigation would be developed on a case-by-case basis.
	If operations cause a water source to become unavailable to wildlife, the Authorized Officer may require a new well to be drilled, or another water development to be constructed in the general area to provide adequate water for wildlife. If the lease area is within a wildlife management area, the Assistant Field Manager may require additional measures, including seasonal restrictions or no surface occupancy.
	If operations cause a water source to become unavailable to wild horses, the Authorized Officer may require a new well to be drilled, or another water development to be constructed in the general area to provide adequate water for the wild horses. If the lease area is within a HMA, the Assistant Field Manager may require additional measures for the protection of wild horses and burros, such as seasonal restrictions.
	Operators would adhere to all Standard Operating Procedures as outlined in this EA, unless specifically waived by the Assistant Field Manager.
	Because playas are important recreational places, apt to have cultural sites nearby and provide critical habitat for some migratory waterbirds and shorebirds, including Special Status Species such as the Snowy Plover, mitigation measures would be developed on a case-by-case basis. Mitigation may include no surface occupancy and seasonal restrictions.

Signature of Lessee
DANIEL SCHOCHET
VICE PRESIDENT

June 30, 2005
Date

RECEIVED
Bur. of Land Management
9:00 A.M. JUL 0 1 2005
NEVADA STATE OFFICE
RENO, NEVADA

Serial Number N-74883

General Stipulations for Leasing Geothermal Resources Managed by the Winnemucca Field Office (Winn Stip)

General Sage Grouse Stipulation
Prior to entry on any lease areas which include known or potential habitat, the lessee (operator) shall contact the appropriate BLM Field Office to discuss any proposed activities.

Other Biota
Prior to site development, a survey for invertebrates will be conducted on areas where geothermal surface expressions occur.

Controlled Or Limited Surface Use (Avoidance and/or Mitigation Measures To Be Developed)
The lease area may now or hereafter contain plants, animals, or their habitats determined to be threatened, endangered, or other special status species. BLM may recommend modifications to exploration and development proposals to further its conservation and management objective to avoid BLM-approved activity that will contribute to a need to list such a species or their habitat. BLM may require modifications to or disapprove proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modifications of a designated or proposed critical habitat. BLM will not approve any ground-disturbing activity that may affect any such species or critical habitat until it completes its obligations under applicable requirements of the Endangered Species Act, 16 U.S.C. 1531, as amended, including completion of any required procedure for conference or consultation.

Wild Horse and Burros
If wild horse or burro populations are located on sites proposed for development, it may be necessary to avoid or develop mitigation measures to reduce adverse impacts to horses. These measures may include providing alternative water sources for horses of equal quality and quantity.

Migratory Birds
Surface disturbing activities during the migratory bird nesting season (March to July) may be restricted in order to avoid potential violation of the Migratory Bird Act. Appropriate inventories of migratory birds shall be conducted during analysis of actual site development. If active nests are located, the proponent shall coordinate with BLM to establish appropriate protection measures for the nesting sites which may include avoidance or restricting or excluding development during certain areas to times when nests and nesting birds will not be disturbed. During development and production phases, if artificial ponds potentially detrimental to migratory birds are created, these shall be fitted with exclusion devices such as netting or floating balls.

Vegetation
All areas of exploration and or development disturbance will be reclaimed including re-contouring disturbed areas to blend with the surrounding topography and using appropriate methods to seed with a diverse perennial seed mix. The seed mix used to reclaim disturbed areas would be "certified" weed free.

Riparian Areas

No surface occupancy within 650 feet (horizontal measurement) of any surface water bodies, riparian areas, wetlands, playas or 100-year floodplains to protect the integrity of these resources (as indicated by the presence of riparian vegetation and not actual water). Exceptions to this restriction may be considered on a case-by-case basis if the BLM determines at least one of the following conditions apply: 1) additional development is proposed in an area where current development has shown no adverse impacts, 2) suitable off-site mitigation will be provided if habitat loss is expected, or 3) BLM determines development proposed under any plan of operations ensures adequate protection of the resources.

Noxious Weeds

During all phases of exploration and development, the lessee shall maintain a noxious weed control program consisting of monitoring and eradication for species listed on the Nevada Designated Noxious Weed List (NRS 555.010).

Cultural Resources

Controlled Or Limited Surface Use (Avoidance and/or Mitigation Measures To Be Developed).
All surface disturbing activities proposed after issuance of the lease are subject to compliance with Section 106 of the National Historic Protection Act (NHPA) and it's implementation through the protocol between the BLM Nevada State Director and the Nevada State Historic Preservation Officer.

Native American

No Surface Occupancy

No surface occupancy within the setting of National Register eligible Traditional Cultural Properties (TCPs) where integrity of the setting is critical to their eligibility. For development and production phases, surface occupancy may be limited to a specific distance or precluded at hot springs, pending conclusion of the Native American consultation process. All development activities proposed under the authority of this lease are subject to the requirement for Native American consultation prior to BLM authorizing the activity. Depending on the nature of the lease developments being proposed and the resources of concerns to tribes potentially effected, Native American consultation and resulting mitigation measures to avoid significant impacts may extend time frames for processing authorizations for development activities, as well as, change in the ways in which developments are implemented.

Paleontological Resources

Where significant paleontological resources are identified, mitigating measures such as data recovery, restrictions on development, and deletion of some areas from development may be required on a case by case basis.

Water Resources

As exploration and development activities commence, the operator shall institute a hydrologic monitoring program. The details of the monitoring programs will be site specific and the intensity shall be commensurate with the level of exploration. For example, if the proponent will be conducting seismic studies the monitoring would be limited to the identification of water resources to be monitored as activities continue; if a drilling program were to be undertaken the number of aquifers encountered, their properties, their quality, and their saturated thickness would be documented.

The information collected will be submitted to the Bureau of Land Management and will be used to support future NEPA documentation as development progresses. Adverse impacts to surface expressions of the geothermal reservoir (hot springs), and Threatened and Endangered Species habitat are not acceptable. The leasee will monitor the quality, quantity, and temperature of any hot springs or other water resource within the project area whenever they are conducting activities which have the potential to impact those resources. If adverse impacts do occur, BLM will require the lessee to take corrective action to mitigate the impact. Corrective action may include shutting down the operation.

These are in addition to the other stipulations. These are LEASE stipulations, not operational, the information gathered under the monitoring stipulation will be used to identify future impacts at the operational stage.

Lands & Realty
No drilling, including exploration or development activities within linear Rights-of-Way.

Hazardous Materials
Prior to exploration and development, an emergency response plan will developed that include contingencies for hazardous material spills and disposal.

Signature of Lessee, Agent, or Attorney in Fact

10 Sept 2002

Date

Serial Number N-74881

General Stipulations for Leasing Geothermal Resources Managed by the Winnemucca Field Office (Winn Stip)

General Sage Grouse Stipulation
Prior to entry on any lease areas which include known or potential habitat, the lessee (operator) shall contact the appropriate BLM Field Office to discuss any proposed activities.

Other Biota
Prior to site development, a survey for invertebrates will be conducted on areas where geothermal surface expressions occur.

Controlled Or Limited Surface Use (Avoidance and/or Mitigation Measures To Be Developed)
The lease area may now or hereafter contain plants, animals, or their habitats determined to be threatened, endangered, or other special status species. BLM may recommend modifications to exploration and development proposals to further its conservation and management objective to avoid BLM-approved activity that will contribute to a need to list such a species or their habitat. BLM may require modifications to or disapprove proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modifications of a designated or proposed critical habitat. BLM will not approve any ground-disturbing activity that may affect any such species or critical habitat until it completes its obligations under applicable requirements of the Endangered Species Act, 16 U.S.C. 1531, as amended, including completion of any required procedure for conference or consultation.

Wild Horse and Burros
If wild horse or burro populations are located on sites proposed for development, it may be necessary to avoid or develop mitigation measures to reduce adverse impacts to horses. These measures may include providing alternative water sources for horses of equal quality and quantity.

Migratory Birds
Surface disturbing activities during the migratory bird nesting season (March to July) may be restricted in order to avoid potential violation of the Migratory Bird Act. Appropriate inventories of migratory birds shall be conducted during analysis of actual site development. If active nests are located, the proponent shall coordinate with BLM to establish appropriate protection measures for the nesting sites which may include avoidance or restricting or excluding development during certain areas to times when nests and nesting birds will not be disturbed. During development and production phases, if artificial ponds potentially detrimental to migratory birds are created, these shall be fitted with exclusion devices such as netting or floating balls.

Vegetation
All areas of exploration and or development disturbance will be reclaimed including re-contouring disturbed areas to blend with the surrounding topography and using appropriate methods to seed with a diverse perennial seed mix. The seed mix used to reclaim disturbed areas would be "certified" weed free.

Riparian Areas

No surface occupancy within 650 feet (horizontal measurement) of any surface water bodies, riparian areas, wetlands, playas or 100-year floodplains to protect the integrity of these resources (as indicated by the presence of riparian vegetation and not actual water). Exceptions to this restriction may be considered on a case-by-case basis if the BLM determines at least one of the following conditions apply: 1) additional development is proposed in an area where current development has shown no adverse impacts, 2) suitable off-site mitigation will be provided if habitat loss is expected, or 3) BLM determines development proposed under any plan of operations ensures adequate protection of the resources.

Noxious Weeds

During all phases of exploration and development, the lessee shall maintain a noxious weed control program consisting of monitoring and eradication for species listed on the Nevada Designated Noxious Weed List (NRS 555.010).

Cultural Resources

Controlled Or Limited Surface Use (Avoidance and/or Mitigation Measures To Be Developed).
All surface disturbing activities proposed after issuance of the lease are subject to compliance with Section 106 of the National Historic Protection Act (NHPA) and it's implementation through the protocol between the BLM Nevada State Director and the Nevada State Historic Preservation Officer.

Native American

No Surface Occupancy

No surface occupancy within the setting of National Register eligible Traditional Cultural Properties (TCPs) where integrity of the setting is critical to their eligibility. For development and production phases, surface occupancy may be limited to a specific distance or precluded at hot springs, pending conclusion of the Native American consultation process. All development activities proposed under the authority of this lease are subject to the requirement for Native American consultation prior to BLM authorizing the activity. Depending on the nature of the lease developments being proposed and the resources of concerns to tribes potentially effected, Native American consultation and resulting mitigation measures to avoid significant impacts may extend time frames for processing authorizations for development activities, as well as, change in the ways in which developments are implemented.

Paleontological Resources

Where significant paleontological resources are identified, mitigating measures such as data recovery, restrictions on development, and deletion of some areas from development may be required on a case by case basis.

Water Resources

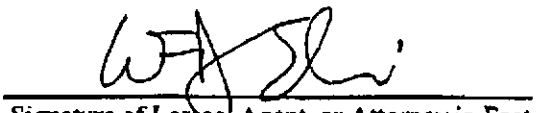
As exploration and development activities commence, the operator shall institute a hydrologic monitoring program. The details of the monitoring programs will be site specific and the intensity shall be commensurate with the level of exploration. For example, if the proponent will be conducting seismic studies the monitoring would be limited to the identification of water resources to be monitored as activities continue; if a drilling program were to be undertaken the number of aquifers encountered, their properties, their quality, and their saturated thickness would be documented.

The information collected will be submitted to the Bureau of Land Management and will be used to support future NEPA documentation as development progresses. Adverse impacts to surface expressions of the geothermal reservoir (hot springs), and Threatened and Endangered Species habitat are not acceptable. The leasee will monitor the quality, quantity, and temperature of any hot springs or other water resource within the project area whenever they are conducting activities which have the potential to impact those resources. If adverse impacts do occur, BLM will require the lessee to take corrective action to mitigate the impact. Corrective action may include shutting down the operation.

These are in addition to the other stipulations. These are LEASE stipulations, not operational, the information gathered under the monitoring stipulation will be used to identify future impacts at the operational stage.

Lands & Realty
No drilling, including exploration or development activities within linear Rights-of-Way.

Hazardous Materials
Prior to exploration and development, an emergency response plan will developed that include contingencies for hazardous material spills and disposal.



Signature of Lessee, Agent, or Attorney in Fact

18 Sept 2007

Date

Serial Number N-74865

GEOTHERMAL LEASE STIPULATIONS

Air Quality
The operator will implement at the direction of the Assistant Field Manager testing of emissions for H_2S and other noxious / deadly gases where there is indication that these gases may occur.

Cultural-Historical Resources
Cultural resources shall be avoided and mitigation measures shall be developed on a case-by-case basis as required by regulations, lease terms and attached stipulations developed during site specific NEPA analysis.

Native American Religious Concerns
As surface disturbing activities occur, the BLM will require the operator to monitor the water temperature and outflow or water from local hot springs and existing wells as directed by the Assistant Field Manager. If the temperature and outflow from the spring or well were impacted to a degree determined by the Assistant Field Manager to be more than negligible, the BLM shall require the operator to take corrective actions. Failure of the operator to take the corrective measures as directed will result in BLM terminating the operation.

Special Status Species
The lease area may now or hereafter contain plants, animals, or their habitats determined to be threatened, endangered, or other special status species. The special status species list is reviewed and / or updated annually and as species are added, new stipulations may add further restrictions. BLM may recommend modifications to exploration and development proposals to further its conservation and management objective to avoid BLM-approved activity that will contribute to a need to list such a species or their habitat. BLM may require modifications to or disapprove proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modification of a designated or proposed critical habitat. BLM will not approve any ground-disturbing activity that may affect any such species or critical habitat until it completes its obligations under applicable requirements of the Endangered Species Act as amended, 16 U.S.C. § 1531 et seq., including completion of any required procedure for conference or consultation.

Exploratory endeavors on the public lands will require a Special Status Species review, and may, at the direction of the Assistant Field Manager, require a field survey for the presence of Special Status Species. Potential impacts to Special Status Species will be analyzed on a case-by-case basis. Mitigation measures shall be developed on an individual project basis depending upon the results of the survey.

Springs within ½ mile of exploration activities shall be inventoried by BLM approved and supervised personnel for the presence of invertebrates. If a rare genus, such as *Pyrgulopsis,* is found, identification to species and monitoring of effects of the proposed action shall be required and site-specific mitigation may be developed by the BLM.

Sage grouse:
BLM will require operations to avoid active leks (strutting grounds) by 2 miles during strutting season (see Management Guidelines for Sage Grouse and Sagebrush Ecosystems in Nevada, October 2000). Approximate dates: March 1 - May 15

Operations shall avoid nesting and brood rearing habitat (especially riparian habitat where broods concentrate beginning usually in June) by ½ mile during the time such areas are in use. Approximate dates: April 1 - August 15

BLM will require operations to avoid sage grouse wintering habitat by ½ mile, while occupied. Most known wintering grounds in the Shoshone-Eureka Resource Area occur at high elevations and are not likely to be affected. Avoidance dates will vary with severity of the winter.

BLM will limit the disturbance to and fragmentation of all known sage grouse habitat.

Ferruginous hawks:
Operations shall avoid active nests by ½ mile. Approximate dates: March 15 - July 1

Hydrology and Water Quality and Quantity

All applicants for exploration permits will be required to submit a surface water inventory to the Assistant Field Manager before authorization may be granted. The inventory will include a map of appropriate scale (such as 1:24,000) indicating the location of all surface water on public land within ½ mile radius from the surface-disturbing activity.

At the commencement of surface disturbing activities for the drilling of exploration wells, the BLM will require that the drilling company monitor the water temperature and outflow of water from local springs and existing wells as directed by the Assistant Field Manager. If the temperature and / or outflow of the water from the spring or well were impacted to a degree determined by the Assistant Field Manager to be more than negligible, the BLM will require the operator to take corrective actions. Failure of the operator to take the corrective measures as directed will result in BLM terminating the operation.

Results will be reported to Federal and State agencies on the status of these hydrologic systems during drilling.

Impacts include, but are not limited to, the following:
Change in water temperature
Change in discharge rate
Substantial decrease in water table level
Surface subsidence

In the event of impacts to surface or subsurface waters, determined by the Assistant Field Manager to be more than negligible, or if a violation of Federal or State water quality standards occurs, the Assistant Field Manager will assess the situation, and may require the operator to amend, relocate or discontinue operations. If operations are terminated, the BLM will develop and the operator shall implement remediation measures.

Additional stipulations may include:
No use of the surface water;
Limitations on the type of equipment that may be used; and
Restrictions of activities during certain times of the year (seasonal restrictions).

Wetlands / Riparian Zones

BLM will direct the operator to avoid surface waters, wetlands and riparian areas. No exploration activities will occur within 100 feet of surface waters, wetlands or riparian areas.

Vegetation shall not be disturbed within 300 feet of waters designated by the Authorized Officer, except at approved stream crossing.

Where surface waters, wetlands and riparian areas cannot be avoided (100 feet for non-surface disturbing exploration activities and 300 feet for surface disturbing exploration activities), mitigation will be developed on a case-by-case basis.

Additional stipulations may include:
No use of the surface water;
Limitations on the type of equipment that may be used; and
Restrictions of activities during certain times of the year (seasonal restrictions).

The BLM will require that the drilling company monitor the temperature and outflow of water from local hot springs. If the temperature and / or outflow of water from a spring were impacted to a degree determined by the Assistant Field Manager to be more than negligible, the BLM will require the operator to take corrective action. Failure of the operator to take the corrective measures as directed will result in BLM terminating the operation.

Invasive Nonnative Species

Areas to be involved in surface disturbing activities will be inventoried for the presence of invasive, nonnative species and treated if present.
The exterior of all vehicles and heavy equipment shall be cleaned by water before entering public lands to do work. To minimize the possibility for contamination, a designated wash area will be designated by the BLM and shall be established and monitored by the operator in high use areas.
The boots of operators and other person working in the areas shall be cleaned of seed before coming onto BLM lands.
The BLM will develop and the operator shall implement a weed treatment program from the time operation commences until the site is abandoned.
Seed and mulch used to reclaim disturbed areas shall be free of invasive nonnative species.
Operators and workers shall avoid driving through or parking in areas where invasive nonnative species occur.
When sites are abandoned, they will be inventoried for the presence of invasive nonnative species and treated if present.

Land Use Authorizations

BLM will require proposals to avoid existing rights-of-way where possible. Proposed leases shall not overlap existing land use authorizations if they would adversely affect the valid existing authorization.

Allotment Management

If operations cause a water source to become unavailable to livestock, the Authorized Officer will require a new well to be drilled, or another water development to be constructed in the general area to provide adequate water for livestock.

If the lease area is within an allotment, the Assistant Field Manager may require additional measures, including seasonal restrictions or no surface occupancy.

Recreation

None identified.

Soils
None identified.

Vegetation
Disturbed areas will be reseeded with native or introduced plant species, depending on the site conditions. Disturbed areas will be reseeded with pure live seed (certified weed free) with the mixes in Appendix F. Native vegetation will be used wherever possible. However, to compete with invasive nonnative species, introduced species, as suggested in the seed list in Appendix F, will be used.

Visual Resources
None identified.

Migratory Birds
The BLM will limit the amount of ground clearing or other disturbance (such as the creation of cross-country access to drill sites) that an operator may do during the migratory bird nesting season. Areas to be disturbed shall be surveyed by personnel approved and supervised by BLM to determine the existence and location of any nests. If any nests are located, the nest will be avoided by ¼ mile. If the nest area cannot be avoided, BLM will develop site-specific mitigation.

Wildlife
If operations cause a water source to become unavailable to wildlife, the Authorized Officer will require a new well to be drilled, or another water development to be constructed in the general area to provide adequate water for wildlife.

If the lease area is within a wildlife management area, the Assistant Field Manager may require additional measures, including seasonal restrictions or no surface occupancy.

Wild Horses and Burros
If operations cause a water source to become unavailable to wild horses, the Authorized Officer may require a new well to be drilled, or another water development to be constructed in the general area to provide adequate water for the wild horses.
If the lease area is within a HMA, the Assistant Field Manager may require additional stipulations for the protection of wild horses and burros, including seasonal restrictions or no surface occupancy.

All Resources
Operators shall adhere to all Standard Operating Procedures as outlined in this EA, unless specifically waived by the Assistant Field Manager.

Playa
Because playas are important recreational places apt to have cultural sites nearby and provide critical habitat for some migratory waterbirds and shorebirds, including Special Status Species such as the Snowy Plover, mitigation measures will be developed on a case-by-case basis. Mitigation may include, but is not limited to, no surface occupancy and seasonal restrictions.

Signature of Lessee, Agent, or Attorney in Fact

12 Sept 2002
Date

Serial Number N-74868

GEOTHERMAL LEASE STIPULATIONS

Air Quality
The operator will implement at the direction of the Assistant Field Manager testing of emissions for H_2S and other noxious / deadly gases where there is indication that these gases may occur.

Cultural-Historical Resources
Cultural resources shall be avoided and mitigation measures shall be developed on a case-by-case basis as required by regulations, lease terms and attached stipulations developed during site specific NEPA analysis.

Native American Religious Concerns
As surface disturbing activities occur, the BLM will require the operator to monitor the water temperature and outflow or water from local hot springs and existing wells as directed by the Assistant Field Manager. If the temperature and outflow from the spring or well were impacted to a degree determined by the Assistant Field Manager to be more than negligible, the BLM shall require the operator to take corrective actions. Failure of the operator to take the corrective measures as directed will result in BLM terminating the operation.

Special Status Species
The lease area may now or hereafter contain plants, animals, or their habitats determined to be threatened, endangered, or other special status species. The special status species list is reviewed and / or updated annually and as species are added, new stipulations may add further restrictions. BLM may recommend modifications to exploration and development proposals to further its conservation and management objective to avoid BLM-approved activity that will contribute to a need to list such a species or their habitat. BLM may require modifications to or disapprove proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modification of a designated or proposed critical habitat. BLM will not approve any ground-disturbing activity that may affect any such species or critical habitat until it completes its obligations under applicable requirements of the Endangered Species Act as amended, 16 U.S.C. § 1531 et seq., including completion of any required procedure for conference or consultation.

Exploratory endeavors on the public lands will require a Special Status Species review, and may, at the direction of the Assistant Field Manager, require a field survey for the presence of Special Status Species. Potential impacts to Special Status Species will be analyzed on a case-by-case basis. Mitigation measures shall be developed on an individual project basis depending upon the results of the survey.

Springs within ½ mile of exploration activities shall be inventoried by BLM approved and supervised personnel for the presence of invertebrates. If a rare genus, such as *Pyrgulopsis,* is found, identification to species and monitoring of effects of the proposed action shall be required and site-specific mitigation may be developed by the BLM.

Sage grouse:
BLM will require operations to avoid active leks (strutting grounds) by 2 miles during strutting season (see Management Guidelines for Sage Grouse and Sagebrush Ecosystems in Nevada, October 2000). Approximate dates: March 1 - May 15

Operations shall avoid nesting and brood rearing habitat (especially riparian habitat where broods concentrate beginning usually in June) by ½ mile during the time such areas are in use. Approximate dates: April 1 - August 15

BLM will require operations to avoid sage grouse wintering habitat by ½ mile, while occupied. Most known wintering grounds in the Shoshone-Eureka Resource Area occur at high elevations and are not likely to be affected. Avoidance dates will vary with severity of the winter.

BLM will limit the disturbance to and fragmentation of all known sage grouse habitat.

Ferruginous hawks:
Operations shall avoid active nests by ½ mile. Approximate dates: March 15 - July 1

Hydrology and Water Quality and Quantity

All applicants for exploration permits will be required to submit a surface water inventory to the Assistant Field Manager before authorization may be granted. The inventory will include a map of appropriate scale (such as 1:24,000) indicating the location of all surface water on public land within ½ mile radius from the surface-disturbing activity.

At the commencement of surface disturbing activities for the drilling of exploration wells, the BLM will require that the drilling company monitor the water temperature and outflow of water from local springs and existing wells as directed by the Assistant Field Manager. If the temperature and / or outflow of the water from the spring or well were impacted to a degree determined by the Assistant Field Manager to be more than negligible, the BLM will require the operator to take corrective actions. Failure of the operator to take the corrective measures as directed will result in BLM terminating the operation.

Results will be reported to Federal and State agencies on the status of these hydrologic systems during drilling.

Impacts include, but are not limited to, the following:
Change in water temperature
Change in discharge rate
Substantial decrease in water table level
Surface subsidence

In the event of impacts to surface or subsurface waters, determined by the Assistant Field Manager to be more than negligible, or if a violation of Federal or State water quality standards occurs, the Assistant Field Manager will assess the situation, and may require the operator to amend, relocate or discontinue operations. If operations are terminated, the BLM will develop and the operator shall implement remediation measures.

Additional stipulations may include:
No use of the surface water;
Limitations on the type of equipment that may be used; and
Restrictions of activities during certain times of the year (seasonal restrictions).

Wetlands / Riparian Zones

BLM will direct the operator to avoid surface waters, wetlands and riparian areas. No exploration activities will occur within 100 feet of surface waters, wetlands or riparian areas.

Vegetation shall not be disturbed within 300 feet of waters designated by the Authorized Officer, except at approved stream crossing.

Where surface waters, wetlands and riparian areas cannot be avoided (100 feet for non-surface disturbing exploration activities and 300 feet for surface disturbing exploration activities), mitigation will be developed on a case-by-case basis.

Additional stipulations may include:
No use of the surface water;
Limitations on the type of equipment that may be used; and
Restrictions of activities during certain times of the year (seasonal restrictions).

The BLM will require that the drilling company monitor the temperature and outflow of water from local hot springs. If the temperature and / or outflow of water from a spring were impacted to a degree determined by the Assistant Field Manager to be more than negligible, the BLM will require the operator to take corrective action. Failure of the operator to take the corrective measures as directed will result in BLM terminating the operation.

Invasive Nonnative Species

Areas to be involved in surface disturbing activities will be inventoried for the presence of invasive, nonnative species and treated if present.
The exterior of all vehicles and heavy equipment shall be cleaned by water before entering public lands to do work. To minimize the possibility for contamination, a designated wash area will be designated by the BLM and shall be established and monitored by the operator in high use areas.
The boots of operators and other person working in the areas shall be cleaned of seed before coming onto BLM lands.
The BLM will develop and the operator shall implement a weed treatment program from the time operation commences until the site is abandoned.
Seed and mulch used to reclaim disturbed areas shall be free of invasive nonnative species.
Operators and workers shall avoid driving through or parking in areas where invasive nonnative species occur.
When sites are abandoned, they will be inventoried for the presence of invasive nonnative species and treated if present.

Land Use Authorizations

BLM will require proposals to avoid existing rights-of-way where possible. Proposed leases shall not overlap existing land use authorizations if they would adversely affect the valid existing authorization.

Allotment Management

If operations cause a water source to become unavailable to livestock, the Authorized Officer will require a new well to be drilled, or another water development to be constructed in the general area to provide adequate water for livestock.

If the lease area is within an allotment, the Assistant Field Manager may require additional measures, including seasonal restrictions or no surface occupancy.

Recreation

None identified.

Soils
None identified.

Vegetation
Disturbed areas will be reseeded with native or introduced plant species, depending on the site conditions. Disturbed areas will be reseeded with pure live seed (certified weed free) with the mixes in Appendix F. Native vegetation will be used wherever possible. However, to compete with invasive nonnative species, introduced species, as suggested in the seed list in Appendix F, will be used.

Visual Resources
None identified.

Migratory Birds
The BLM will limit the amount of ground clearing or other disturbance (such as the creation of cross-country access to drill sites) that an operator may do during the migratory bird nesting season. Areas to be disturbed shall be surveyed by personnel approved and supervised by BLM to determine the existence and location of any nests. If any nests are located, the nest will be avoided by ¼ mile. If the nest area cannot be avoided, BLM will develop site-specific mitigation.

Wildlife
If operations cause a water source to become unavailable to wildlife, the Authorized Officer will require a new well to be drilled, or another water development to be constructed in the general area to provide adequate water for wildlife.

If the lease area is within a wildlife management area, the Assistant Field Manager may require additional measures, including seasonal restrictions or no surface occupancy.

Wild Horses and Burros
If operations cause a water source to become unavailable to wild horses, the Authorized Officer may require a new well to be drilled, or another water development to be constructed in the general area to provide adequate water for the wild horses.
If the lease area is within a HMA, the Assistant Field Manager may require additional stipulations for the protection of wild horses and burros, including seasonal restrictions or no surface occupancy.

All Resources
Operators shall adhere to all Standard Operating Procedures as outlined in this EA, unless specifically waived by the Assistant Field Manager.

Playa
Because playas are important recreational places apt to have cultural sites nearby and provide critical habitat for some migratory waterbirds and shorebirds, including Special Status Species such as the Snowy Plover, mitigation measures will be developed on a case-by-case basis. Mitigation may include, but is not limited to, no surface occupancy and seasonal restrictions.

Signature of Lessee, Agent, or Attorney in Fact

12 Sept 2002
Date

Serial Number **N-74869**

GEOTHERMAL LEASE STIPULATIONS

Air Quality

The operator will implement at the direction of the Assistant Field Manager testing of emissions for H_2S and other noxious / deadly gases where there is indication that these gases may occur.

Cultural-Historical Resources

Cultural resources shall be avoided and mitigation measures shall be developed on a case-by-case basis as required by regulations, lease terms and attached stipulations developed during site specific NEPA analysis.

Native American Religious Concerns

As surface disturbing activities occur, the BLM will require the operator to monitor the water temperature and outflow or water from local hot springs and existing wells as directed by the Assistant Field Manager. If the temperature and outflow from the spring or well were impacted to a degree determined by the Assistant Field Manager to be more than negligible, the BLM shall require the operator to take corrective actions. Failure of the operator to take the corrective measures as directed will result in BLM terminating the operation.

Special Status Species

The lease area may now or hereafter contain plants, animals, or their habitats determined to be threatened, endangered, or other special status species. The special status species list is reviewed and / or updated annually and as species are added, new stipulations may add further restrictions. BLM may recommend modifications to exploration and development proposals to further its conservation and management objective to avoid BLM-approved activity that will contribute to a need to list such a species or their habitat. BLM may require modifications to or disapprove proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modification of a designated or proposed critical habitat. BLM will not approve any ground-disturbing activity that may affect any such species or critical habitat until it completes its obligations under applicable requirements of the Endangered Species Act as amended, 16 U.S.C. § 1531 et seq., including completion of any required procedure for conference or consultation.

Exploratory endeavors on the public lands will require a Special Status Species review, and may, at the direction of the Assistant Field Manager, require a field survey for the presence of Special Status Species. Potential impacts to Special Status Species will be analyzed on a case-by-case basis. Mitigation measures shall be developed on an individual project basis depending upon the results of the survey.

Springs within ½ mile of exploration activities shall be inventoried by BLM approved and supervised personnel for the presence of invertebrates. If a rare genus, such as *Pyrgulopsis,* is found, identification to species and monitoring of effects of the proposed action shall be required and site-specific mitigation may be developed by the BLM.

Sage grouse:

BLM will require operations to avoid active leks (strutting grounds) by 2 miles during strutting season (see Management Guidelines for Sage Grouse and Sagebrush Ecosystems in Nevada, October 2000). Approximate dates: March 1 - May 15

Operations shall avoid nesting and brood rearing habitat (especially riparian habitat where broods concentrate beginning usually in June) by ½ mile during the time such areas are in use. Approximate dates: April 1 - August 15

BLM will require operations to avoid sage grouse wintering habitat by ½ mile, while occupied. Most known wintering grounds in the Shoshone-Eureka Resource Area occur at high elevations and are not likely to be affected. Avoidance dates will vary with severity of the winter.

BLM will limit the disturbance to and fragmentation of all known sage grouse habitat.

Ferruginous hawks:
Operations shall avoid active nests by ½ mile. Approximate dates: March 15 - July 1

Hydrology and Water Quality and Quantity

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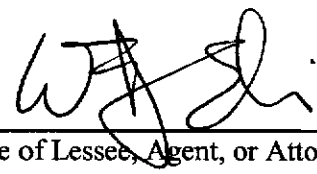


Signature of Lessee, Agent, or Attorney in Fact

12 Sept 2002

Date

REVISED
OPERATIONS PLAN

BUFFALO VALLEY
GEOTHERMAL DEVELOPMENT PROJECT

LANDER COUNTY, NEVADA

APRIL 2009
REVISED FEBRUARY 2010
REVISED MARCH 2010
REVISED APRIL 2010

Project Applicant:

ORMAT NEVADA, INC.
6225 NEIL ROAD
RENO, NEVADA 89511-1163

BUFFALO VALLEY
GEOTHERMAL DEVELOPMENT PROJECT

OPERATIONS PLAN
§3261.12

Ormat Nevada, Inc. (Ormat) is proposing to construct, operate, and maintain the Buffalo Valley Geothermal Development Project (Project), in Lander County, Nevada (see Figure 1). The Project would include the construction and operation of a power generation facility, geothermal production and injection well pads and wells, access roads, geothermal fluid pipelines, an electrical transmission line and ancillary support facilities.

This Operations Plan is for the drilling and testing of geothermal wells within the Buffalo Valley geothermal Unit area (NVN-83484X). The Unit area (Buffalo Valley Project area) is comprised of federal geothermal leases NVN-74869, NVN-74865 and NVN-74868, in Sections 13-14, 22-27 and 34-35, Township 29 North (T29N), Range 43 East (R43E), Mount Diablo Baseline & Meridian (MDB&M) (see Figure 2).

The site is accessed by travelling south on State Route 305 from Battle Mountain approximately 14 miles and turning off onto a two lane dirt road signed as the Newmont Mining Corporation Phoenix Mine road. Proceed to the west approximately 11.2 miles and turn off at the intersection with the Buffalo Valley Ranch Road. Traversing approximately 15 miles to the southwest (see Figure 1).

Within the Buffalo Valley Project area, three geothermal well locations were selected (shown in Figure 3 and identified in Table 1).

Table 1: Buffalo Valley Well Locations

Well Name (Modified Kettleman No.)	Lease Number	Township/ Range	Legal Description (Section Number & Aliquot Part)	Approximate UTM Coordinates (NAD83)	
				Easting (m)	Northing (m)
34-13	NVN-74869	T29N, R43E	SE1/4, NW1/4 Section 13	472994	4470679
46-13	NVN-74869	T29N, R43E	NE1/4, SW1/4 Section 13	473216	4470309
17-13	NVN-74869	T29N, R43E	SW1/4, SW1/4 Section 13	472676	4470185

The contents of this Operations Plan are organized as requested in 43 CFR 3261.12, as detailed below.

§ 3261.12 What is an operations plan?

An operations plan describes how you will drill for and test the geothermal resources covered by your lease. Your plan must tell BLM enough about your proposal to allow us to assess the environmental impacts of your operations. This information should generally include:

(a) Well pad layout and design:

Each well pad would be about 400 feet by 450 feet, and disturb an area of about 180,000 square feet (approximately 4.1 acres). A typical well pad site layout is provided as Figure 5. Actual dimensions of each drill pad would be modified to best match the specific physical and environmental characteristics of the site and to minimize grading (cut and fill).

The estimated maximum total area of new surface disturbance required for the three Buffalo Valley well pads would be about 12.3 acres (approximately 4.1 acres per pad * 3 pads).

Each drill pad would be prepared to create a level pad for the drill rig and a graded surface for the support equipment. Storm water runoff from undisturbed areas around the constructed drill pads would be directed into ditches surrounding the drill pad and back onto undisturbed ground consistent with best management practices for storm water. The site would be graded to prevent the movement of storm water from the pad off of the constructed site, and has been designed for a 100 year storm.

Fenced reserve pits would be constructed in accordance with best management practices identified in the "Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development (The Gold Book)" (Fourth Edition – 2007) on each pad for the containment and temporary storage of water, drill cuttings and waste drilling mud during drilling operations. The reserve pits would be fenced with an exclosure fence on three sides and then fenced on the fourth side once drilling has been completed to prevent access by persons, wildlife or livestock (see Figure 6). The fence would remain in place until pit reclamation begins. For the drilling of each well, the reserve pit would measure approximately 75 feet by 200 feet by up to 10 feet deep.

Once drilling is complete, approximately half of this drill pad area can be reclaimed, but the remaining half must be kept clear for ongoing operations and the potential need to work on or re-drill the well. Areas able to be reclaimed will be reseeded with native grasses and forbs. The stockpiled topsoils will also be spread on the area to aid in revegetation (see also Section (g) below)

(b) A description of existing and planned access roads

The site is accessed by travelling south on State Route 305 from Battle Mountain approximately 14 miles and turning off onto a two lane dirt road signed as the Newmont Mining Corporation Phoenix Mine road. Proceed to the west approximately 11.2 miles and turn off at the intersection with the Buffalo Valley Ranch Road. Traversing approximately 15 miles to the southwest (see Figure 1).

Ormat has reached an agreement with Pershing County in which Ormat has agreed to a specified dollar amount necessary to repair, upgrade and maintain the County road. Additionally, Ormat has had conversations with Lander County and verbally agreed to compensate the County for road maintenance at their request.

To access the drill sites, new roads with a 15-foot wide road bed would be constructed using a dozer and/or road grader. New access roads would be required as follows (see Figure 3):

- About 1,275 feet of new road would be constructed to 17-13;
- About 1,925 feet of new road would be constructed to 34-13 from site 17-13; and
- About 1,180 feet of new road would be constructed to 46-13.

The total estimated area of surface disturbance required for new access road (and turnout) construction, assuming a 20-foot wide area of disturbance would be about 2.47 acres.

Constructed access roads crossing existing drainages may require installation of culverts. Culvert installation would follow BLM design criteria and would be constructed pursuant to standards established in the Gold Book (Fourth Edition – Revised 2007).

Water would be applied to the ground during the construction and utilization of the access roads as necessary to control fugitive dust (see also Section (h) below).

(c) A description of any ancillary facilities;

Each well would be drilled with a large rotary drill rig. During drilling, the top of the drill rig mast could be as much as 170 feet above the ground surface. The typical drill rig and associated support equipment (rig floor and stands; draw works; mast; drill pipe; trailers; mud, fuel and water tanks; diesel generators; air compressors; etc.) would be brought to the prepared pad on 25 or more large tractor-trailer trucks. Additional equipment and supplies would be brought to the drill site during ongoing drilling and testing operations.

As many as ten or more tractor-trailer truck trips would be generated on the busiest day, although on average about two to three large tractor-trailer trucks (delivering drilling supplies and equipment), and about eight small trucks/service vehicles/worker vehicles, would be driven to the site each day throughout the typical 45-day drilling process. Difficulties encountered during the drilling process, including the need to work over or to re-drill the hole, could double the time necessary to successfully complete an exploration well. Drilling would be conducted 24-hours per day, 7-days per week by a crew of nine to ten workers. During short periods, the number of workers on site during drilling would be as high as 18.

The drilling supervisor and mud logger would typically sleep in a trailer on the active drill site while the well is being drilled. The drilling crew may also live “on site” during the drilling operations in a self-contained “bunkhouse” (sleeping quarters, galley, water tank and septic tank) or portable trailers which would be placed on one of the drill sites not being actively drilled to accommodate the drill rig workers.

(d) The source of drill pad and road building material;

Drill pad preparation activities would include clearing, earthwork, drainage and other improvements necessary for efficient and safe operation and for fire prevention. Only those drill pads scheduled to be drilled would be cleared. Clearing would include removal of organic material, stumps, brush and slash, which would be removed and taken to an appropriate dump site. Topsoil would be stripped (typically to the rooting depth) and salvaged during the construction of all pads and new access roads, as feasible. Salvaged topsoil would be stockpiled on the pads for use during subsequent reclamation of the disturbed areas.

Drill pad and road building material (gravel) would be obtained from a private aggregate source located approximately 3 miles south of the town of Battle Mountain.

Drill pads are site specific and selected to minimize the need for aggregate application. At most, each drill pad (exclusive of the reserve pit) would be covered with up to 4 inches of gravel (approximately 2,000 cubic yards/pad * 3 pads totals 6,000 cubic yards).

Up to 4 inches of gravel would be applied to the improved access roads, as necessary, to create an all-weather surface (0.83 miles of new roads * 4 inches of aggregate totals approximately 1,300 cubic yards)

Total aggregate required for the well pad and access road construction is estimated at 7,300 cubic yards (6,000 cubic yards for pad construction plus 1,300 cubic yards for road construction).

(e) The water source;

Water required for well drilling could range up to as much as 30,000 gallons per day. Water requirements for grading, construction, and dust control would average substantially less. One or more portable water tank(s) holding a combined total of at least 10,000 gallons would be maintained on the well sites during drilling operations.

Water necessary for all of these activities would be obtained from an established private ranch source (Saval Ranch, S1/2 Section 10, T26N, R39E) and trucked to each construction or drill site.

(f) A statement describing surface ownership;

The Buffalo Valley geothermal unit (NVN-83484X) is comprised of federal geothermal leases NVN-74869, NVN-74865 and NVN-74868. (see Figure 2).

(g) Plans for surface reclamation;

After the well drilling and testing operations are completed, the liquids from the reserve pits would either naturally evaporate or be removed as may be necessary to reclaim the reserve pits. The solid contents remaining in each of the reserve pits, typically consisting of non-hazardous, non-toxic drilling mud and rock cuttings, would be tested to confirm that they are not hazardous. Typical tests may include the Toxicity Characteristic Leaching Procedure (TCLP) (EPA Method 1311), tested for heavy metals; pH (EPA method 9045D); Total Petroleum Hydrocarbons/Diesel (EPA Method 8015B); and Oil and Grease (EPA Method 413.1). If the test results indicate that these solids are non-hazardous, the solids would then be mixed with the excavated rock and soil and buried by backfilling the reserve pit.

If a well is judged by Ormat to have no commercial potential, it may continue to be monitored, but would eventually be plugged and abandoned in conformance with the well abandonment requirements of the BLM and NDOM. Abandonment typically involves filling the well bore with clean, heavy abandonment mud and cement until the top of the cement is at ground level, which is designed to ensure that fluids would not move across these barriers into different aquifers. The well head (and any other equipment) would then be removed, the casing cut off well below ground surface and the hole backfilled to the surface.

Following the abandonment of a well, the access road(s) and well pad constructed as part of the Operations Plan would be reclaimed. Each well pad and constructed road would be disked and graded, if necessary, to de-compact the soil, turn under any applied gravel, and restore grade (if necessary), and the stockpiled topsoil (if any) would be placed back over the disturbed areas.

(h) A description of procedures to protect the environment and other resources;

Ormat would comply with all special lease stipulations attached to the federal geothermal leases which are applicable to Project operations on these leases. In addition, Ormat would implement the following additional environmental protection measures:

- Water would be applied to the ground during the construction and utilization of the drill pads and access roads as necessary to control dust.

- Portable chemical sanitary facilities would be available and used by all personnel during periods of well drilling and/or flow testing. These facilities would be maintained by a local contractor.

(i) Any other information we may require.

Well Drilling

The wells would each be drilled and cased to a design depth of approximately 7,000 feet, or the depth selected by the project geologist. Blow Out Prevention Equipment (BOPE), which is typically inspected and approved by the BLM and Nevada Divison of Minerals (NDOM), would be utilized while drilling below the surface casing. During drilling operations, a minimum of 10,000 gallons of cool water and 12,000 pounds of inert, non-toxic, non-hazardous barite (barium sulfate) would likely be stored at each well site for use in preventing uncontrolled well flow ("killing the well"), as necessary.

The well bore would be drilled using non-toxic, temperature-stable drilling mud composed of a bentonite clay-water or polymer-water mix for all wells. Variable concentrations of additives would be added to the drilling mud as needed to prevent corrosion, increase mud weight, and prevent mud loss. Some of the mud additives may be hazardous substances, but they would only be used in low concentrations that would not render the drilling mud toxic. Additional drilling mud would be mixed and added to the mud system as needed to maintain the required quantities.

In the event that very low pressure areas are encountered, compressed air may be added to the drilling mud, or used instead of drilling mud, to reduce the weight of the drilling fluids in the hole and assist in carrying the cuttings to the surface. The air, any drilling mud, rock cuttings, and any reservoir fluids brought to the surface would be diverted through a separator/muffler to separate and discharge the air and water vapor to the air and the drilling mud and cuttings to the reserve pit.

Each well may need to be worked over or redrilled if mechanical or other problems are encountered while drilling or setting casing which prevent proper completion of the well in the targeted geothermal reservoir or if the well does not exhibit the anticipated permeability, productivity or injectivity. Depending on the circumstances encountered, working over a well may consist of lifting the fluid in the well column with air or gas or stimulation of the formation using dilute acid or rock fracturing techniques. Well redrilling may consist of either: 1) reentering and redrilling the existing well bore; 2) reentering the existing well bore and drilling and casing a new well bore; or 3) sliding the rig over a few feet on the same well pad and drilling a new well bore through a new conductor casing.

Flow Testing

Once the slotted liner has been set in the bottom of the well bore, and while the drill rig is still over the well, the residual drilling mud and cuttings would be flowed from the well bore and discharged to the reserve pit. This may be followed by one or more short-term flow tests. Each test, lasting approximately 3 to 5 days on average, would consist of flowing the well into the reserve pit or portable steel tanks brought onto the well site while monitoring geothermal fluid temperatures, pressures, flow rates, chemistry and other parameters. An "injectivity" test may also be conducted by injecting the produced geothermal fluid from the reserve pit or steel tanks back into the well and the geothermal reservoir. The drill rig would likely be moved from the well

site following completion of these short-term test(s). Each short-term well test is expected to flow approximately 1.5 million gallons.

One or more long-term flow test(s) of each well drilled would likely be conducted following the short-term flow test(s) to more accurately determine long-term well and geothermal reservoir productivity. The long-term flow test(s), each lasting between 7-30 days, would be conducted by either pumping the geothermal fluids from the well through onsite test equipment closed to the atmosphere (using a line shaft turbine pump or electric submersible pump), or allowing the well to flow naturally to the surface, where the produced steam and non-condensable gases (including any hydrogen sulfide), separated from the residual geothermal fluid, would be discharged into the atmosphere. In either case, a surface booster pump would then pump the residual produced geothermal fluid to the constructed reserve pit. The onsite test equipment would include standard flow metering, recording, and sampling apparatus Each long-term well test is expected to flow approximately 15 million gallons.

A surface booster pump would then pump the residual produced geothermal water/fluid from the reserve pit through a temporary 8" to 10" diameter pipeline to either inject the fluid into one of the other geothermal wells drilled within the Project area or to the reserve pit on another well pad. The temporary pipeline would either be laid "cross-country" or on the surface of the disturbed shoulders on the access roads connecting the geothermal full-size wells (as required, roads would be crossed by trenching and burying the temporary pipe in the trench). The onsite test equipment would include standard flow metering, recording, and sampling apparatus.

Emergency Contingency Plans

A. Injury Contingency Plan

Drilling operators are required by law to safety train workers and to have first aid equipment on site. Ormat supervises the drilling operations to ensure that all safety procedures and best safety practices are in place and adhered to throughout the drilling program. Ormat's contract with the drilling company specifies that safety regulations are implemented and adhered to by the drilling contractor, and that the operation is in compliance with all existing laws pertaining to safety and environmental protection. Safety meetings are held prior to any major operation, such as running casing, cementing, or unloading the well. Drilling contractors would typically have daily safety meeting with crews and review any issues that could come up during the 12 hours that each crew is at work.

In the event injuries occur in connection with an Ormat Nevada Inc. (Ormat) operation, specific and immediate attention would be given to proper transportation to a medical facility.

Ambulance (911)

Battle Mountain Ambulance Service
25 E. 2nd Street (or) 550 W. 2nd Street
Battle Mountain, NV Battle Mountain, NV
(775) 635-1111 (775) 635-2190

Battle Mountain General Hospital
535 S. Humboldt
Battle Mountain, NV
(775) 635-2550

Lander County Sheriff Department
(775) 635-1100

B. Fire Contingency Plan

1. Any small fires which occur around the well pad during drilling and/or testing operations should be able to be controlled by rig personnel utilizing on-site firefighting equipment.

2. The BLM Battle Mountain District Office (775.635.4000) would be notified of any wildland fire, even if the available personnel can handle the situation or the fire poses no threat to the surrounding area. Additionally, the Central Nevada Interagency Dispatch (CNIDC) would be notified (775.623.1555 during business hours, 775.623.3444 after business hours).

3. A roster of emergency phone numbers would be available onsite so that the appropriate firefighting agency can be contacted in case of a fire.

4. All vehicles shall carry at a minimum a shovel and five gallons of water (preferably in a backpack pump), in addition to a conventional fire extinguisher.

5. Adequate fire fighting equipment (a shovel, a pulaski, standard fire extinguisher(s), and an ample water supply) shall be kept readily available at each active drill site.

6. Vehicle catalytic converters (on vehicles that would enter and leave the drill site on a regular basis) shall be inspected often and cleaned of all flammable debris.

7. All cutting/welding torch use, electric-arc welding, and grinding operations shall be conducted in an area free, or mostly free, from vegetation. An ample water supply and shovel shall be on hand to extinguish any fires created from sparks. At least one person in addition to the cutter/welder/grinder shall be at the work site to promptly detect fires created by sparks.

8. Personnel would be responsible for being aware of and complying with the requirements of any fire restrictions or closures issued by the BLM Battle Mountain District Office, as publicized in the local media or posted at various sites throughout the field office district.

C. Spill or Discharge Contingency Plan

1. Potential Sources of Accidental Spills or Discharges
   a. Geothermal Fluid
      Accidental geothermal fluid spills or discharges are very unlikely because the hole would be cased and blowout prevention equipment would be utilized. However, accidental discharges or spills could result from any of the following:
      (1) Loss of well control (blowout);
      (2) Pipeline leak or rupture;
      (3) Leakage from test tank

   b. Drilling Muds
      Muds are a mixture of water, non-toxic chemicals and solid particles used in the drilling operations to lubricate and cool the bit in the hole, to carry cuttings out of the hole, to maintain the hole condition and to control formation pressure. Drilling

muds are prepared and stored in metal tanks at the drilling site. Waste drilling mud and cuttings are discharged into the reserve pit, which is open and is adequately sized to hold the volume necessary for the operation. Accidental discharges of drilling mud are unlikely, but could occur by:
(1) overflow of the reserve pit;
(2) reserve pit wall seepage or wall failure;
(3) discharge from equipment failure on location; or
(4) shallow lost circulation channeling to the surface.

c. Lubricating or Fuel Oils and Petroleum Products

A discharge of this type would probably be very small and be from equipment used in the field. To minimize the potential for spills, all petroleum products on site are labeled, stored and handled in conformance with applicable federal and state requirements. All materials except diesel fuel are stored in the original shipping containers. Diesel fuel is stored in on-board tanks on the drill rig and replenished from a bulk tank truck using an electric transfer pump and hard lines. Supervisors trained in spill prevention, containment and clean-up are on-site 24 hours a day. Potential locations for accidental spills are:
(1) drilling equipment and machinery at and around the drilling location;
(2) other miscellaneous equipment and machinery at well site and roads;
(3) storage areas; and
(4) equipment servicing areas.

d. Construction/Maintenance Debris

Trash shall be contained on-site and hauled to an approved landfill. Burial of trash on-site shall not be permitted.

2. Plan for Cleanup and Abatement

In the event of discharge of formation fluids, drilling muds or petroleum products, the person responsible for the operation would make an immediate investigation, then contact the Drilling Supervisor and advise him of the spill. The Drilling Supervisor would in turn call out equipment, regulate field operations, or do other work as applicable for control and clean up of the spill, as follows:

a. Action - Small, Containable Spill

If the spill is small (i.e., less than 25 gallons) and easily containable without endangering the watershed, the Drilling Supervisor would direct and supervise complete cleanup and return to normal operations.

b. Action - Large or Uncontainable Spill

If the spill is larger than 25 gallons, or is not easily contained, or endangers, or has entered, the watershed, the Drilling Supervisor would proceed to take necessary action to curtail, contain and cleanup the spill, as above, and notify personnel as listed below.

c. Notification

(1) The Drilling Supervisor would, as quickly as practicable:
- Call out contractor(s), as required.
- Notify the Ormat Project Manager.
- Notify the local and state law enforcement agencies if the public safety is threatened.

(2) The Ormat Project Manager would notify the following as soon as practical and work closely with them in all phases of the curtailment, containment and cleanup operations:

Division of Minerals
State of Nevada
400 W. King
Carson City, NV 89703
775.684.7040

NDEP
Division of Emergency Management
901 S. Stewart Street
Carson City, NV 89706
775.688.2830 or 888.331.6337

BLM, Battle Mountain District Office
(within 24 hours of the knowledge of a reportable release)
50 Bastian Road
Battle Mountain, Nevada 89820
775.635.4000

National Response Center
800.424.8802

The Drilling Supervisor would also advise local population and affected property owners if spill affects residents or property.

d. Specific Procedures

(1) For geothermal fluid spills:

- Contain spillage with dikes if possible and haul to disposal site by vacuum or water trucks or dispose of in a manner acceptable to the Division of Minerals and Bureau of Land Management.

(2) For drilling mud:

- Repair reserve pit or contain with dikes. Haul liquid to another reserve pit, available tanks or approved disposal site.

(3) For petroleum products:

- Contain spill with available manpower. Use absorbents and dispose of same in approved disposal area.
- Spills of petroleum products in excess of 25 gallons must be reported to the Nevada Division of Environmental Protection as soon as possible, but no later than the end of the first working day of the release at:
    - In-state: 888-331-6337
    - Out of state: 775-687-9485

For (1) through (3) above, Ormat would have the source of spill repaired at the earliest practical time, and continue working crews and equipment on cleanup until all concerned agencies are satisfied.

e. Confirm telephone notification to agencies and regulatory bodies. Telephone notification shall be confirmed by the Ormat Project Manager in writing within two weeks of telephone notification.

Written confirmation would contain:
(1) Reason for the discharge or spillage.
(2) Duration and volume of discharge or spillage.
(3) Steps taken to correct problem.
(4) Steps taken to prevent recurrence of problem.

D. Hydrogen Sulfide Contingency Plan

1. Although there is very little chance that drilling in these moderate-temperature geothermal reservoirs would encounter substantial hydrogen sulfide, continuous

hydrogen sulfide monitors would be on the rig floor and at the mud tanks and shaker to alert workers should elevated hydrogen sulfide levels be detected. Self contained air packs would be on site for use by workers in an emergency. Signs would be posted to inform workers and visitors of any potential issues.

2. Drilling parameters would be continuously monitored, and any changes in gas concentrations, formation pressures, or potential for flow are provided to the driller and supervisor. The BOPE would be in place to shut off any unexpected gas flows. In the event of any evidence of high gas concentrations are detected in the drilling fluids, the drilling fluids consultant would obtain materials and design a program to safely circulate out the gas bubble and to treat and remove any hydrogen sulfide using caustic soda, caustic soda and peroxide or other technology as appropriate.

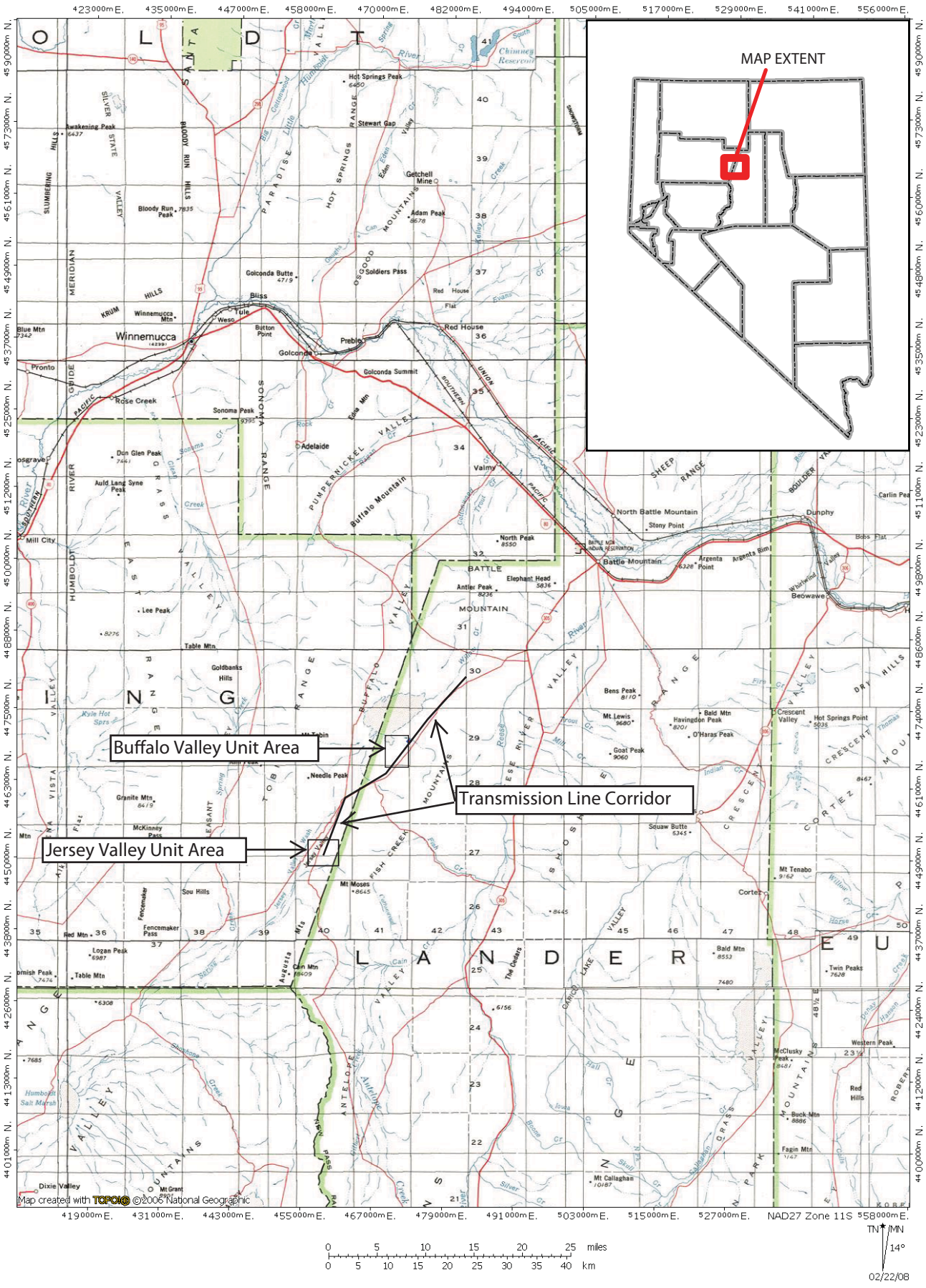


Figure 1: Project Vicinity Map

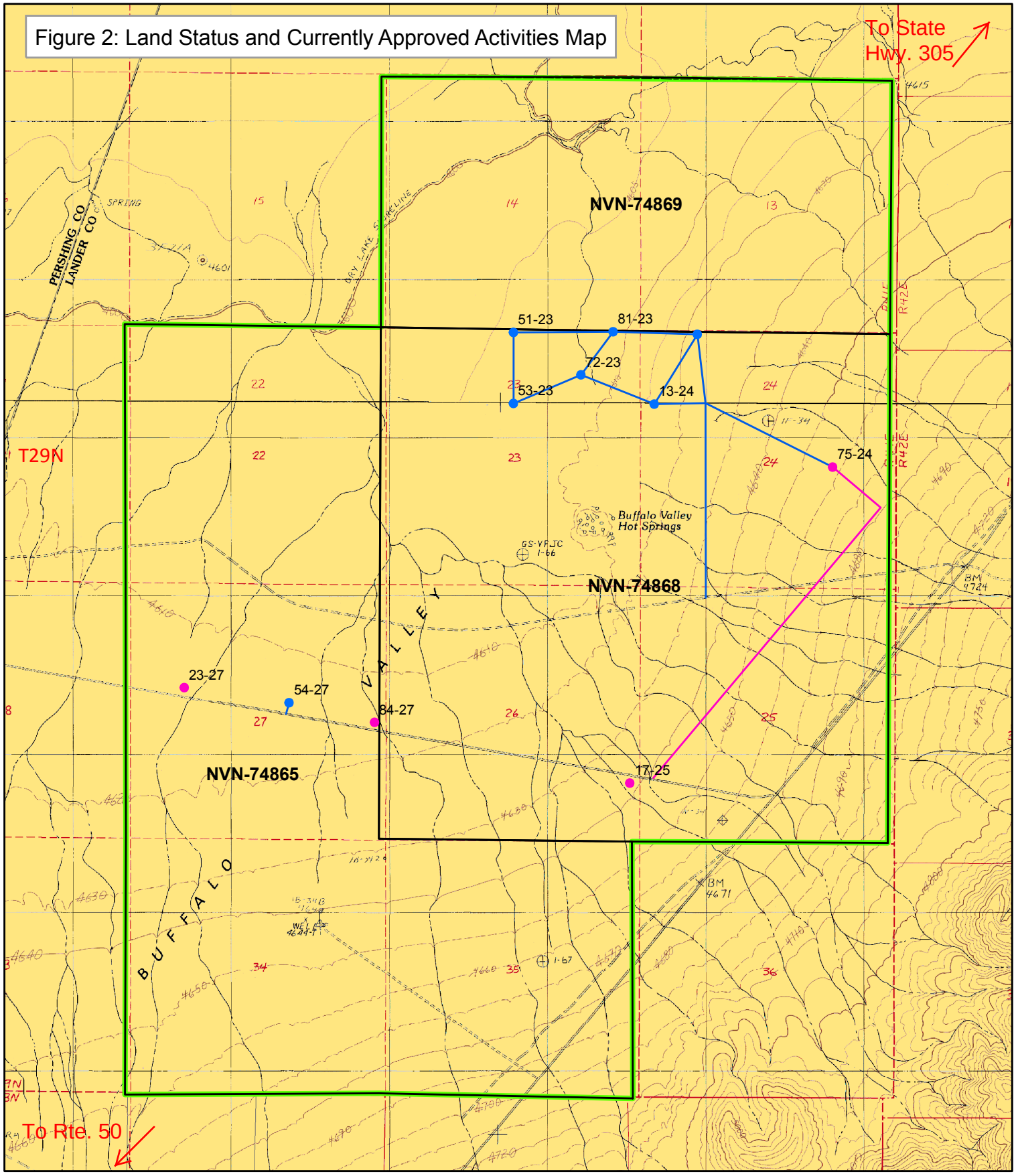


Figure 2: Land Status and Currently Approved Activities Map
To State Hwy. 305
NVN-74869
NVN-74868
NVN-74865
51-23
81-23
72-23
53-23
13-24
75-24
17-25
23-27
54-27
84-27
T29N
R42E
Buffalo Valley Hot Springs
BUFFALO VALLEY
PERSHING CO
LANDER CO
To Rte. 50
LEGEND
Previously Approved Sites (2006)
Previously Approved Sites (2008)
Previously Approved Access (2006)
Previously Approved Access (2008)
Lease Boundary
Buffalo Valley Geothermal Unit Boundary
Bureau of Land Management Lands
N
W
E
S
0
0.3
0.6
1.2 Miles
ORMAT
Map Date: 04/01/09

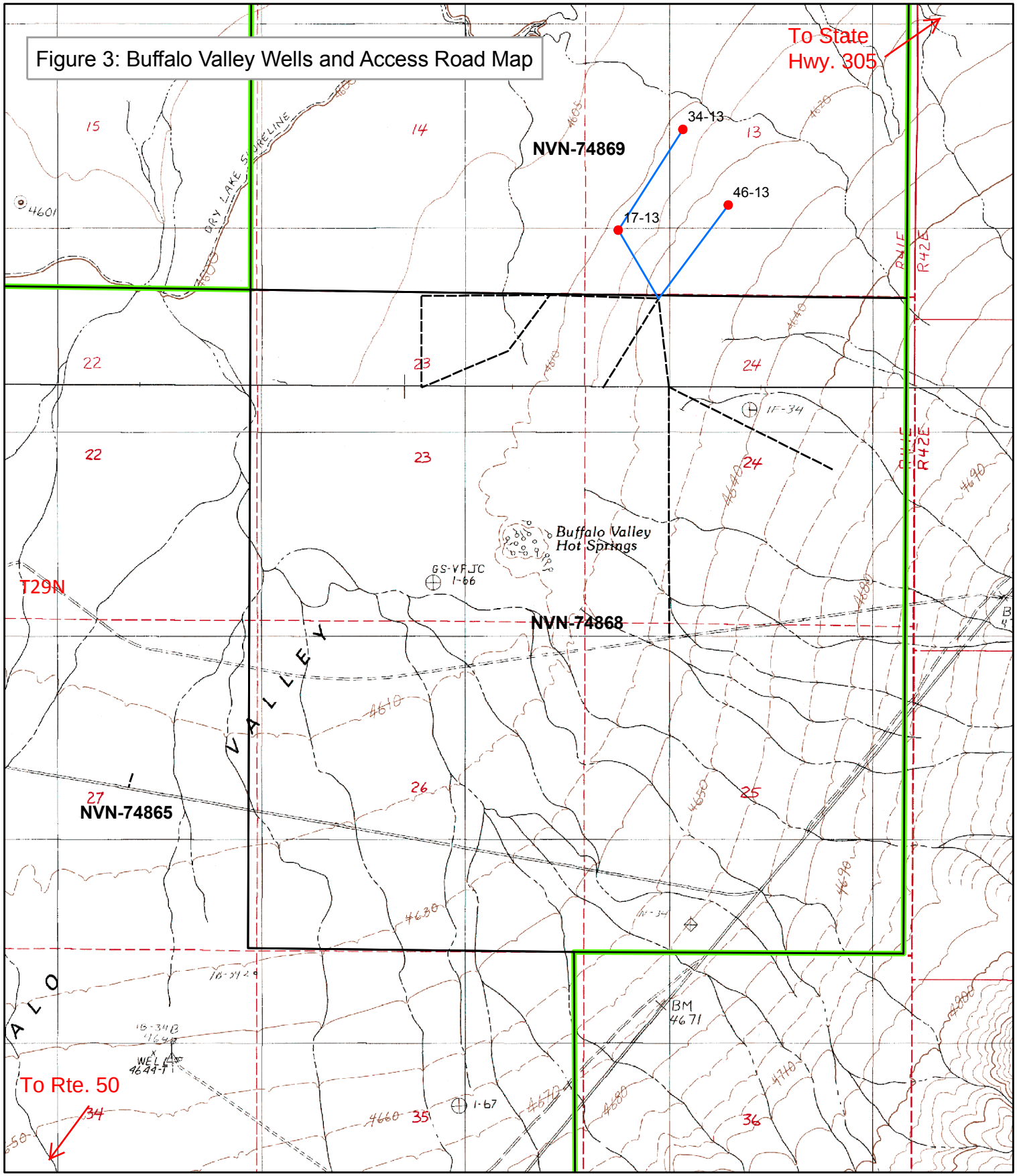
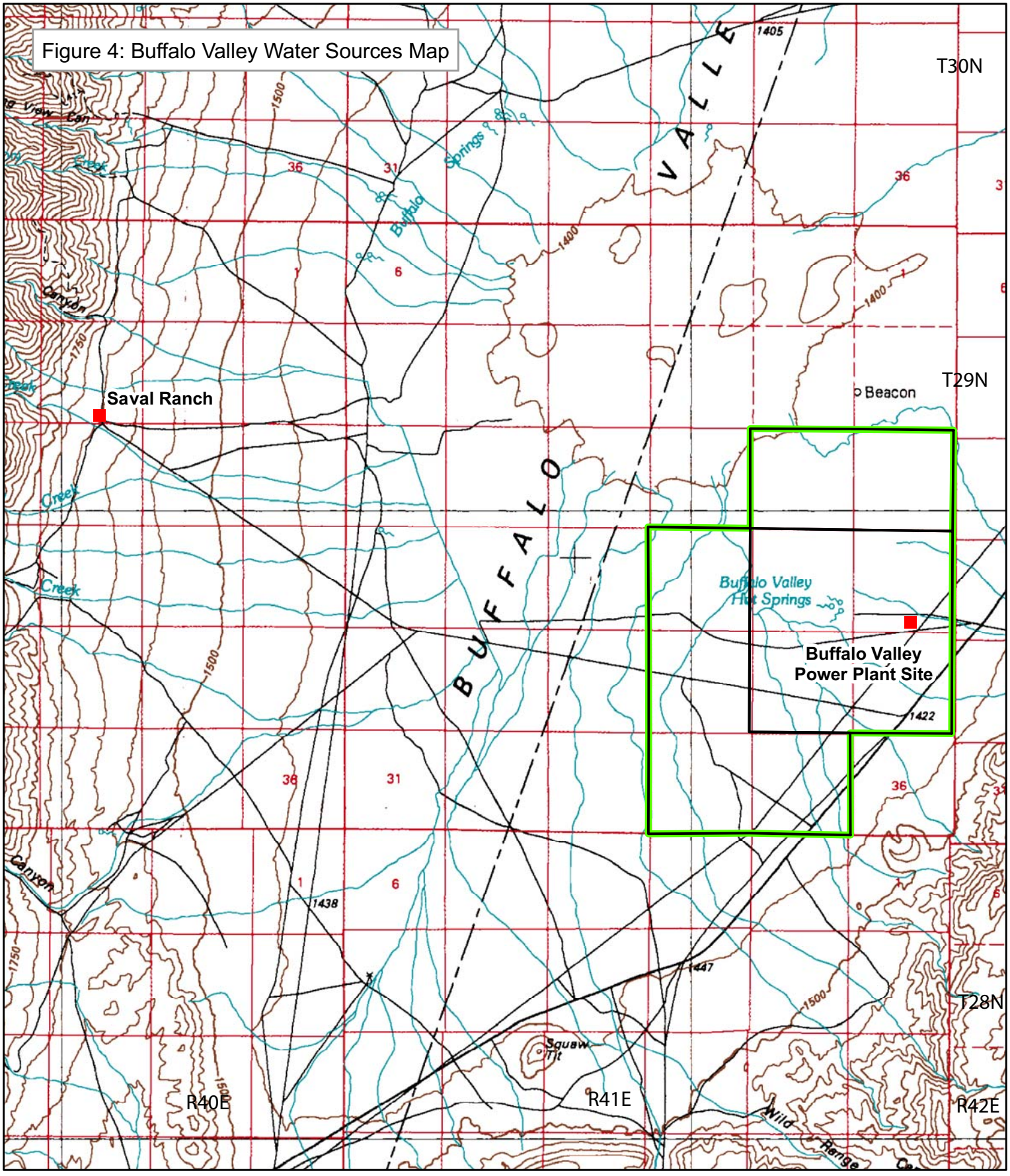


Figure 3: Buffalo Valley Wells and Access Road Map
To State Hwy. 305
34-13
46-13
17-13
NVN-74869
NVN-74868
NVN-74865
Buffalo Valley Hot Springs
T29N
R42E
BUFFALO VALLEY
DRY LAKE SURELINE
To Rte. 50
BM 4671
LEGEND
Proposed Site
Existing Access
Proposed Access
Lease Boundary
Buffalo Valley Geothermal Unit Boundary
Intermittent Stream
N
W
E
S
0
0.25
0.5
1 Miles
ORMAT
Map Date: 11/30/09



LEGEND

- Possible Water Sources
- Buffalo ValleyLease Boundary
- Buffalo Valley Geothermal Unit Boundary
- Intermittent Stream

N
W E
S

0 0.5 1 2 Miles

ORMAT

Map Date: 11/30/09

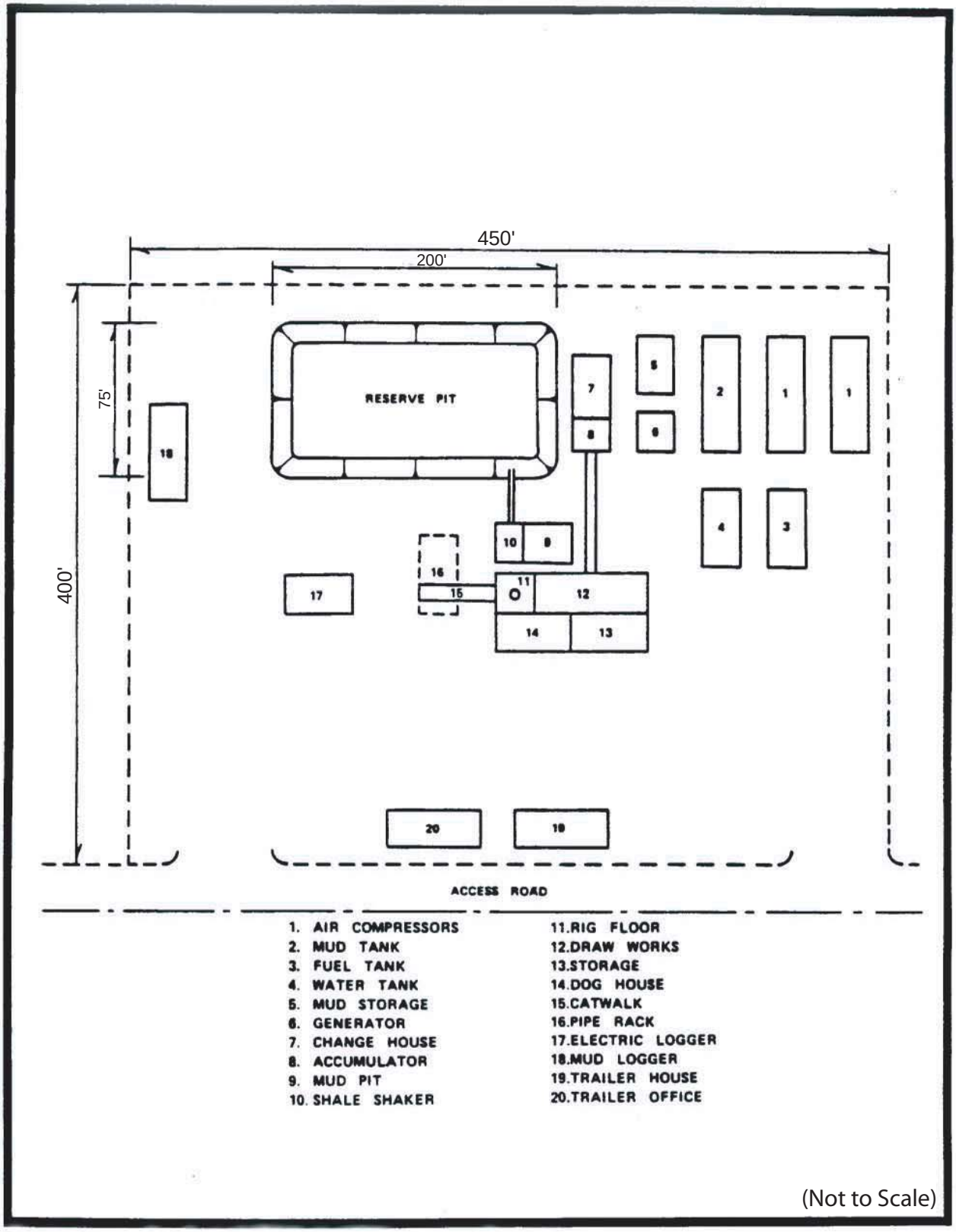
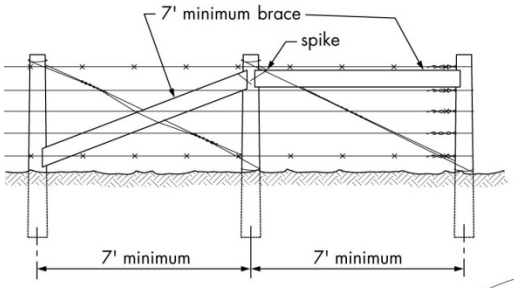
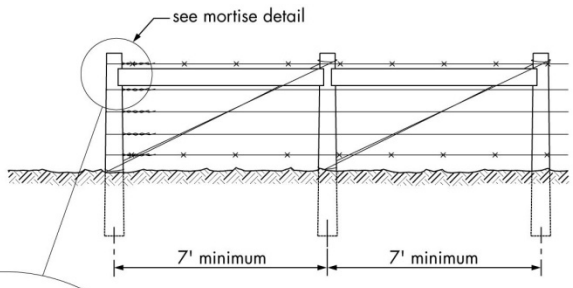


Figure 5: Typical Full-Size Well Site Layout

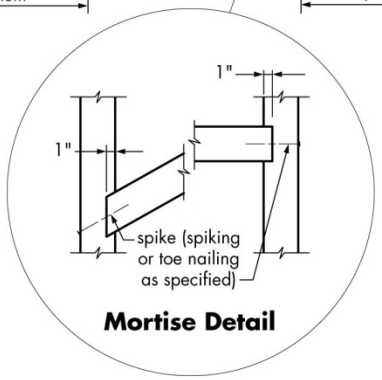
Figure 6: Recommended Construction Standards for Exclosure Fences in Livestock Areas



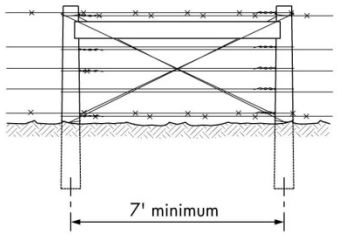
End Panel–Type 1



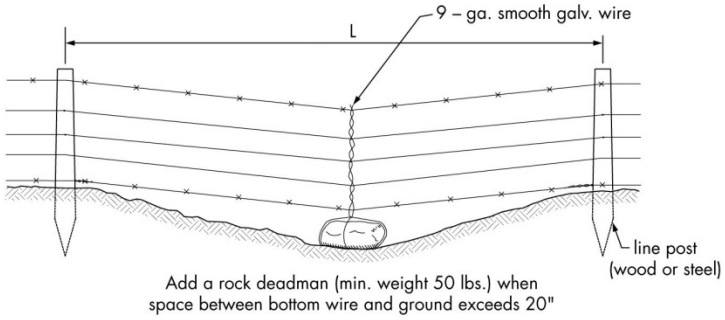
End Panel–Type 2



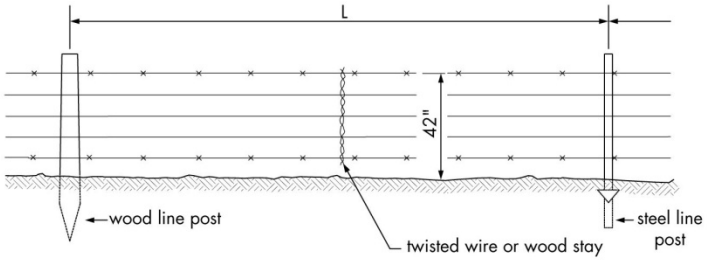
Mortise Detail



Stress Panel



Panel at Minor Depression



Line Panels

REVISED
UTILIZATION PLAN

BUFFALO VALLEY
GEOTHERMAL DEVELOPMENT PROJECT

LANDER COUNTY, NEVADA

APRIL 2009
REVISED FEBRUARY 2010
REVISED MARCH 2010
APRIL 2010

Project Applicant:

ORMAT NEVADA, INC.
6225 NEIL ROAD
RENO, NV 89511

ORMAT NEVADA, INC.
BUFFALO VALLEY
GEOTHERMAL DEVELOPMENT PROJECT

REVISED
UTILIZATION PLAN
43 CFR 3272.11 AND 3272.12

Ormat Nevada, Inc. (Ormat) is proposing to construct, operate, and maintain the Buffalo Valley Geothermal Development Project (Project). The Project would include the construction and operation of a energy generation facility, geothermal fluid production and injection well pads and wells, access roads, geothermal fluid pipelines, an electrical transmission line, and ancillary support facilities. The Project is located in Lander County, Nevada (see **Figure 1**)

The Project is located within the Buffalo Valley Geothermal Unit (NVN-83484X), which is comprised of federal geothermal leases NVN-74869, NVN-74865 and NVN-74868. The Buffalo Valley Unit area encompasses approximately 6,400 acres of public lands in Sections 13-14, 22-27 and 34-35, Township 29 North (T29N), Range 41 East (R41E), Mount Diablo Baseline & Meridian (MDB&M), in Lander County, Nevada (see **Figure 2**)

The site is accessed by travelling south on State Route 305 from Battle Mountain approximately 14 miles and turning off onto a two lane dirt road signed as the Newmont Mining Corporation Phoenix Mine road. Proceed to the west approximately 11.2 miles and turn off at the intersection with the Buffalo Valley Ranch Road. Traversing approximately 15 miles to the southwest (see **Figure 1**)).

The contents of this Utilization Plan are organized as requested in 43 CFR 3272.11 and 43 CFR 3272.12, as detailed below.

§ 3272.11 How should I describe the proposed utilization facility?

Your description must include:

(a) A generalized description of all proposed structures and facilities, including their size, location, and function;

Energy Plant

The Buffalo Valley energy plant would be a 25 megawatt (MW) (net rated) geothermal energy plant. The proposed energy plant would be located on approximately 9-acres in the SW1/4, SE1/4 Section 24 T29N, R41E. An approximately 0.50 acre substation, used to transform generated low voltage electrical energy to the higher voltage required for a transmission line, would be constructed within the energy plant boundary (see **Figure 3**).

The most prominent features of the energy plant, both in height and mass, are the air-cooled condensers. They range between 28 and 35 feet in height and are about two-thirds the length of the site. The balance of the plant is an array of pipes and a small building to house electrical equipment. The perimeter of the site is fenced with chain link to prevent unauthorized entry.

Well Field and Ancillary Facilities

The number of geothermal production and injection wells required for the Project is principally dependent on the productivity (or injectivity) of the wells and the temperature and pressure of the produced geothermal fluid. Production wells flow geothermal fluid to the surface. Injection wells are used to inject geothermal fluid from the energy plant into the geothermal reservoir. Injection ensures the longevity and renewability of the geothermal resource.

Ormat is proposing 10 production wells and 5 injection wells, all located within the Buffalo Valley Unit on public lands managed by the Bureau of Land Management (BLM).

Figure 3 shows the locations of these proposed production and injection wells, and **Table 1** lists the name, legal description and approximate location of each of these production and injection wells.

Table 1: Buffalo Valley Production and Injection Wells

Well Name (Modified Kettleman No.)	Township/ Range	Legal Description (Section Number & Aliquot Part)	Approximate UTM Coordinates (NAD83)	
			Easting (m)	Northing (m)
Production Wells				
75-24*	T29N, R41E	NE1/4, SE1/4 Section 24	473728	4469011
34-13	T29N, R41E	SE1/4, NW1/4 Section 13	472994	4470679
46-13	T29N, R41E	NE1/4, SW1/4 Section 13	473216	4470309
17-13	T29N, R41E	SW1/4, SW1/4 Section 13	472676	4470185
51-23	T29N, R41E	NW1/4, NE1/4 Section 23	471710	4469863
81-23*	T29N, R41E	NE1/4, NE1/4 Section 23	472340	4469867
21-24*	T29N, R41E	NW1/4, NW1/4 Section 24	472873	4469850
72-23*	T29N, R41E	NE1/4, NE1/4 Section 23	472137	4469594
53-23*	T29N, R41E	SW1/4, NE1/4 Section 23	471710	4469413
13-24*	T29N, R41E	SW1/4, NW1/4 Section 24	472600	4469410
Injection Wells				
17-25	T29N, R41E	SW1/4, SW1/4 Section 25	472447	4467014
84-27*	T29N, R41E	SE1/4, NE1/4 Section 27	470833	4467398
23-27*	T29N, R41E	SW1/4, NW1/4 Section 27	469629	4467617
32-25*	T29N, R41E	NE1/4, NW1/4 Section 25	473021	4467781
54-27*	T29N, R41E	SW1/4, NE1/4 Section 27	470293	4467521
* Denotes wells that are currently approved.				

The production and injection well locations are tentative and may need to be adjusted as additional geologic, geophysical and geothermal reservoir information is obtained as new wells are drilled and tested.

Temporary surface disturbance for the proposed 10 production and 5 injection wells would be 61.50 acres (30.75 acres permanent surface disturbance).

Geothermal Fluid Pipelines

The geothermal fluid production and injection pipelines would bring the geothermal fluid from the production wells to the energy plant and deliver the cooled geothermal fluid from the energy plant to the injection wells, respectively.

Proposed production and injection pipeline routes are shown in **Figure 3**. Approximately 3.78 miles of production pipeline and 3.06 miles of injection pipeline are proposed.

The production and injection pipeline routes generally follow the shortest distance from each well pad to the next well pad or the energy plant in order to minimize the amount of pipe required, reduce heat losses and the energy required to move the fluids, and minimize the amount of ground disturbance. In addition, the proposed pipeline routes generally follow existing or proposed roads to facilitate ongoing monitoring and future maintenance.

However, the final alignment of the pipeline routes would be dictated by the specific wells completed for the project and the need to match fluid characteristics and balance fluid volumes in these pipelines.

(b) A generalized description of proposed facility operations, including estimated total production and injection rates; estimated well flow rates, pressures, and temperatures; facility net and gross electrical generation; and, if applicable, interconnection with other utilization facilities. If it is a direct use facility, send us the information we need to determine the amount of resource utilized;

The 25 MW (net rated) Ormat energy plant would utilize a binary design with an air-cooled heat rejection system.

The geothermal fluids for the binary energy plant would be produced from the production wells by pumping. Once delivered to the energy plant, the heat in the geothermal fluid would be transferred to the “binary” (or secondary) fluid in multiple stage non-contact heat exchangers. The binary turbine units would use pentane (C_5H_{12}), a flammable but non-toxic hydrocarbon, as the binary fluid, which circulates in a closed loop. The heat from the geothermal fluid vaporizes the binary fluid, which turns the binary turbine and electrical generator to make electricity.

The vaporized binary fluid exits the turbine and is condensed back into a liquid in a shell-and-tube, non-contact, air-cooled condenser. The condensed binary fluid is then pumped back to the heat exchangers for re-heating and vaporization, completing the closed cycle.

The residual geothermal fluid from the heat exchangers is pumped under pressure out to the geothermal injection wells through the injection pipelines and injected back into the geothermal reservoir. The geothermal fluid would flow through the binary energy plant in a closed system, with no emissions of non-condensable gases to the atmosphere.

During normal well field operations, total geothermal fluid production rates are expected to be approximately 15,150 gallons per minute (gpm) at 335°F. Individual production well flow rates are expected to be approximately 2,165 gpm with a wellhead pressure of about 220 pounds per square inch gauge (psig).

Geothermal fluid injection rates are approximately 15,150 gpm. Individual injection wells are expected to receive between 2,165 gpm of 170°F geothermal fluid with wellhead injection pressures of about 300 psig.

(c) A contour map of the entire utilization site, showing production and injection well pads, pipeline routes, facility locations, drainage structures, and existing and planned access and lateral roads;

Please see **Figure 3**.

(d) A description of site preparation and associated surface disturbance, including the source for site or road building materials, amounts of cut and fill, drainage structures, analysis of all site evaluation studies prepared for the site(s), and a description of any additional tests, studies, or surveys which are planned to assess the geologic suitability of the site(s);

As much as possible, native materials (derived from grading to balance cut and fill) would be used for site and road building materials. Approximately 20,000 yards of surfacing material may be needed. Drill pad and road building material (gravel) would be obtained from a private aggregate source located approximately 3 miles south of the town of Battle Mountain.

Pipeline Construction

Pipeline construction would begin by vertically auguring nominal 24-inch diameter holes into the ground about eight to ten feet deep at approximately 30-foot intervals along the pipeline route (twin holes for two supports may be drilled at the pipeline anchor points, which would be located at the center of each expansion loop and in between each expansion loop). Dirt removed from the holes would be cast on the ground adjacent to each hole. The steel pipe “sleeper” would be placed in the hole and concrete poured to fill the hole slightly above the ground surface. The steel pipe sleeper would extend above the concrete, averaging approximately one foot above ground surface.

While the concrete is curing, the approximately 30-foot long steel pipe sections would be delivered and placed along the construction corridor. A small crane would lift the pipe sections onto the pipe supports and temporary pipe jacks so that they could be welded together into a solid pipeline. Once welded and the welds tested, the pipe would be jacketed with insulation and an aluminum sheath (appropriately colored, likely covert green, to blend with the area).

When completed, the top of the new geothermal pipelines would average three feet above the ground surface. However, a number of pipeline lengths could be up to six feet in height to accommodate terrain undulations and to facilitate movement of wildlife and livestock through the wellfield.

Electrical power and instrumentation cables for the wells would then either be installed in steel conduit constructed along the same pipe sleepers or buried in a trench dug along the pipeline route. If the trenching option for the energy and control cables is selected, an approximately 12-inch wide trench would be excavated to an average depth of approximately three feet deep along side the pipeline sleepers.

The pipelines would be constructed across roads to allow continued vehicle access. This would typically use the cut-and-fill method, where a trench would be cut through the road, a prefabricated, "U"-shaped, oversized pipe sleeve (containing the fabricated geothermal fluid pipeline with the insulation and metal cladding in place) installed in the trench, the excavated dirt backfilled and compacted around and above the oversize pipe sleeve, and the roadbed material repaired or replaced. Alternatively, the pipelines could be constructed across the roads on sleepers (as described above) and the roadbed run up and over the pipeline. This would entail constructing a concrete conduit over a pipeline where it crosses a road, then compacting dirt on either side of the conduit sufficient to ramp the roadbed up and over the conduit to allow traffic to travel over the pipeline.

Energy Plant Construction

Energy plant site preparation activities would begin with clearing, earthwork, drainage and other improvements necessary for commencement of construction. Clearing would include removal of organic material, stumps, brush and slash.

A portion of the energy plant site and adjacent well pads would be devoted to equipment and materials laydown, storage, construction equipment parking, small fabrication areas, office trailers and parking. Equipment and materials laydown space is required for large turbine parts, structural steel, piping spools, electrical components, switchyard apparatus, and building parts. Mobile trailers or similar suitable facilities (e.g., modular offices) would be brought to the site to be used as construction offices for owner, contractor, and subcontractor personnel. Travel trailers would be used for construction management to reside on the site and would provide for 24 hour management and emergency response. Parking would be provided for construction workers and visitors within the energy plant area.

Temporary utilities would be provided for the construction offices, the laydown area, and the energy plant site. Temporary construction energy would be supplied by a temporary generator and, if available when the transmission line is completed, at the site by utility-furnished power. Area lighting would be provided for safety and security. Drinking water would be imported and distributed daily. Portable toilets would be provided throughout the site, office and travel trailers and would connect to temporary septic holding systems.

Consistent with safety requirements, energy plant buildings, structures, pipe, etc. would each be painted an appropriate color (likely covert green) to blend with the area and minimize visibility.

(e) The source, quality, and proposed consumption rate of water used during facility operations, and the source and quantity of water used during facility construction;

Water required for construction activities would be obtained from an established private ranch source (Saval Ranch, S1/2 Section 10, T26N, R39E) and trucked onsite (see **Figure 4**). Alternatively, a temporary water well would be drilled from one or more of the proposed well drill pads. Approximately 5,000 gallons per day (5.60 acre-feet per year) would be consumed during construction of the energy plant.

Up to approximately 325 gallons of water will be consumed per day for the facility operations (0.37 acre-feet per year). This water will be obtained from the established private ranch sources identified above (see **Figure 4**). This water, used for septic purposes, will be trucked to the

power plant and stored onsite. Drinking water will be purchased form a commercial bottled water source

Water quality information would be known prior to its usage.

(f) The methods for meeting air quality standards during facility construction and operation, especially standards concerning noncondensible gases;

There would be no non-condensable gas emissions during normal operations. However, some of the binary working fluid would be released to the atmosphere from rotating seals and flanges. Also during normal operations, a small quantity of air enters the pentane loop in the air-cooled condenser. This air leaked into the pentane loop is discharged back to the atmosphere through a stack, along with a small quantity of pentane. During major maintenance activities on the pentane side of the binary power plant units, the liquid pentane would first be transferred to the pentane storage tank. However, not all of the pentane can be removed in this manner, and the residual pentane would be discharged to the atmosphere when the binary power plant unit is opened. All of these releases, estimated to average about 12 tons per year, are regulated through a permit issued by BAPC to ensure that these emissions do not result in ambient concentrations of ozone (which can be created from the reaction of ambient concentrations of hydrocarbons and NO_x) in excess of the applicable Ambient Air Quality Standards.

Ormat would continue to maintain its Surface Area Disturbance (SAD) permit with the NDEP-BAPC, and continue to implement the required actions to minimize fugitive dust emissions, during the well drilling and construction phases of the project. Once the plant is operational, the SAD regulation would continue as a part of the Project NDEP-BAPC Air Quality Operating permit.

(g) An estimated number of personnel needed during construction and operation of the facility;

Project construction would likely require a maximum of up to 50 workers, with an average of 20 workers after grading and excavation. Once operating, the Project would have approximately 20 employees. The power plants would be staffed and approximately 5 employees may be onsite at a given time. All workers/employees are expected to live in Battle Mountain.

(h) A construction schedule;

Construction of the energy plant and well field facilities would take approximately 1 year once all permits are obtained and equipment orders are scheduled.

(i) A schedule for testing of the facility and/or well equipment, and for the start of commercial operations;

Flow, temperature and pressure would be continuously monitored. Well integrity would be tested every five years. Commercial operations are anticipated to commence at the end of the first quarter of 2010.

(j) A description of architectural landscaping or other measures to minimize visual impacts; and

The energy plant, pipelines, wellheads, pump motors and motor control buildings would each be painted an appropriate color (likely covert green) to blend with the area and minimize visibility. The fence constructed around each of the production well sites would also be painted an appropriate color (likely covert green) to blend with the area.

(k) Any additional information or data which we may require.

Ormat would provide appropriate additional information upon request.

§ 3272.12 How do I describe the environmental protection measures I intend to take?

(a) Describe, at a minimum, your proposed measures to:

(1) Prevent or control fires;

All construction and operating equipment would be equipped with applicable exhaust spark arresters. Fire extinguishers would be available on the site. Water that is used for construction and dust control would be available for fire fighting. Personnel would be allowed to smoke only in designated areas, and they would be required to follow applicable BLM regulations regarding smoking. The following fire contingency plan is provided below:

Fire Contingency Plan

1. Any small fires which occur around the well pad during drilling and/or testing operations should be able to be controlled by rig personnel utilizing on-site firefighting equipment.

2. The BLM Battle Mountain District Office (775.635.4000) would be notified of any wildland fire, even if the available personnel can handle the situation or the fire poses no threat to the surrounding area. Additionally, the Central Nevada Interagency Dispatch (CNIDC) would be notified (775.623.1555 during business hours, 775.623.3444 after business hours).

3. A roster of emergency phone numbers would be available onsite so that the appropriate firefighting agency can be contacted in case of a fire.

4. All vehicles shall carry at a minimum a shovel and five gallons of water (preferably in a backpack pump), in addition to a conventional fire extinguisher.

5. Adequate fire fighting equipment (a shovel, a pulaski, standard fire extinguisher(s), and an ample water supply) shall be kept readily available at each active drill site.

6. Vehicle catalytic converters (on vehicles that would enter and leave the drill site on a regular basis) shall be inspected often and cleaned of all flammable debris.

7. All cutting/welding torch use, electric-arc welding, and grinding operations shall be conducted in an area free, or mostly free, from vegetation. An ample water supply and shovel shall be on hand to extinguish any fires created from sparks. At least one person in addition to the cutter/welder/grinder shall be at the work site to promptly detect fires created by sparks.

8. Personnel would be responsible for being aware of and complying with the requirements of any fire restrictions or closures issued by the BLM Battle Mountain District Office, as publicized in the local media or posted at various sites throughout the field office district.

(2) Prevent soil erosion;

BLM best management practices for storm water would be followed, as applicable, on public lands as described below. Cut and fill activities would be minimized through the selection of the energy plant site and pipeline routes. Off-site storm water would be intercepted in ditches and channeled to energy dissipaters as necessary to minimize erosion around the energy plant. To minimize erosion from storm water runoff, access roads would be maintained consistent with the best management practices to development roads. BLM best management practices for storm water would be followed, as applicable, on public lands.

(3) Protect surface or ground water;

Geothermal fluids would not be discharged to the ground under normal operating conditions. Accidental discharges of geothermal fluids are unlikely because of frequent inspections, ultrasonic testing of the pipeline, flow and pressure monitoring and well pump and pipeline valve shutdown features. Further, geothermal wells are cased to prevent co-mingling of the geothermal fluids with underground aquifers.

(4) Protect fish and wildlife;

There is no known fish habitat within the proposed project area.

Many disturbed areas can begin to be reclaimed almost immediately after construction is completed. Erosion control measures after construction would include revegetation and periodic maintenance. Disturbed areas that would not be used after construction would be revegetated with the proper seed mixture and planting procedures prescribed by the BLM. Any topsoils enriched in organic material may be stockpiled on previously disturbed areas and applied to enhance areas to be reclaimed by revegetation. Periodic maintenance of the energy plant site would be conducted as needed to minimize continual erosion.

To prevent undue degradation and removal of habitat, cover and food, existing roads would be used whenever possible and cross country travel would be restricted to designated construction areas. Furthermore, the energy plant site would be fenced to prevent wildlife from entering.

Additionally, once the well is drilled and well head completed, an industrial grate is placed over the hole to prevent humans and wildlife from falling into the cellar.

(5) Protect cultural, visual, and other natural resources;

Cultural resource surveys have been conducted. Any areas which contain NRHP-eligible and unevaluated cultural resource sites would be avoided. Ormat employees, contractors, and suppliers would be reminded that all cultural resources are protected and if found or discovered shall be left in place and reported to the Ormat representative and/or their supervisor.

Please see section 3272.11(j) above for a discussion of measures to reduce visual impacts.

(6) Minimize air and noise pollution; and

Ormat would comply with any air quality requirements prescribed by the NDEP-BAPC. Compaction of the energy plant site and any potential new well pads during construction, and gravel placed on the access roads would alleviate a large portion of the fugitive dust emissions. In addition, watering the ground would be used to reduce dust emissions during construction. State of the art equipment and design would be used to ensure minimal emissions of pentane. The energy plant would not have any air emissions during normal operation.

To abate noise pollution, mufflers would be used on all drilling rig engines. Construction and drilling noise would be minimized through operational practices, which would avoid or minimize practices that typically generate high noise levels or distinctive noise impacts.

(7) Minimize hazards to public health and safety during normal operations.

Construction and operation activities would be conducted in a manner to avoid creating any hazards to public health and safety. The project is remotely located and would not likely cause hazards to public health and safety. A power plant operations and maintenance manual would be developed in parallel with site construction. This manual would be available onsite once the plant commences operations.

Additionally, a spill or discharge contingency plan is provided below:

<u>Spill or Discharge Contingency Plan</u>

1. Potential Sources of Accidental Spills or Discharges
   a. Geothermal Fluid
      Accidental geothermal fluid spills or discharges are very unlikely because the hole would be cased and blowout prevention equipment would be utilized. However, accidental discharges or spills could result from any of the following:
      (1) Loss of well control (blowout);
      (2) Pipeline leak or rupture;
      (3) Leakage from test tank

   b. Drilling Muds
      Muds are a mixture of water, non-toxic chemicals and solid particles used in the drilling operations to lubricate and cool the bit in the hole, to carry cuttings out of the hole, to maintain the hole condition and to control formation pressure. Drilling muds are prepared and stored in metal tanks at the drilling site. Waste drilling mud and cuttings are discharged into the reserve pit, which is open and is

adequately sized to hold the volume necessary for the operation. Accidental discharges of drilling mud are unlikely, but could occur by:
(1) overflow of the reserve pit;
(2) reserve pit wall seepage or wall failure;
(3) discharge from equipment failure on location; or
(4) shallow lost circulation channeling to the surface.

c. Lubricating or Fuel Oils and Petroleum Products

A discharge of this type would probably be very small and be from equipment used in the field. To minimize the potential for spills, all petroleum products on site are labeled, stored and handled in conformance with applicable federal and state requirements. All materials except diesel fuel are stored in the original shipping containers. Diesel fuel is stored in on-board tanks on the drill rig and replenished from a bulk tank truck using an electric transfer pump and hard lines. Supervisors trained in spill prevention, containment and clean-up are on-site 24 hours a day. Potential locations for accidental spills are:
(1) drilling equipment and machinery at and around the drilling location;
(2) other miscellaneous equipment and machinery at well site and roads;
(3) storage areas; and
(4) equipment servicing areas.

d. Construction/Maintenance Debris

Trash shall be contained on-site and hauled to an approved landfill. Burial of trash on-site shall not be permitted.

2. Plan for Cleanup and Abatement

In the event of discharge of formation fluids, drilling muds or petroleum products, the person responsible for the operation would make an immediate investigation, then contact the Drilling Supervisor and advise him of the spill. The Drilling Supervisor would in turn call out equipment, regulate field operations, or do other work as applicable for control and clean up of the spill, as follows:

a. Action - Small, Containable Spill

If the spill is small (i.e., less than 25 gallons) and easily containable without endangering the watershed, the Drilling Supervisor would direct and supervise complete cleanup and return to normal operations.

b. Action - Large or Uncontainable Spill

If the spill is larger than 25 gallons, or is not easily contained, or endangers, or has entered, the watershed, the Drilling Supervisor would proceed to take necessary action to curtail, contain and cleanup the spill, as above, and notify personnel as listed below.

c. Notification

(1) The Drilling Supervisor would, as quickly as practicable:
- Call out contractor(s), as required.
- Notify the Ormat Project Manager.
- Notify the local and state law enforcement agencies if the public safety is threatened.

(2) The Ormat Project Manager would notify the following as soon as practical and work closely with them in all phases of the curtailment, containment and cleanup operations:

Division of Minerals
State of Nevada
400 W. King
Carson City, NV 89703
775.684.7040

NDEP
Division of Emergency Management
901 S. Stewart Street
Carson City, NV 89706
775.688.2830 or 888.331.6337

BLM, Battle Mountain District Office
(within 24 hours of the knowledge of a reportable release)
50 Bastian Road
Battle Mountain, Nevada 89820
775.635.4000

National Response Center
800.424.8802

The Drilling Supervisor would also advise local population and affected property owners if spill affects residents or property.

d. Specific Procedures

(1) For geothermal fluid spills:

- Contain spillage with dikes if possible and haul to disposal site by vacuum or water trucks or dispose of in a manner acceptable to the Division of Minerals and Bureau of Land Management.

(2) For drilling mud:

- Repair reserve pit or contain with dikes. Haul liquid to another reserve pit, available tanks or approved disposal site.

(3) For petroleum products:

- Contain spill with available manpower. Use absorbents and dispose of same in approved disposal area.
- Spills of petroleum products in excess of 25 gallons must be reported to the Nevada Division of Environmental Protection as soon as possible, but no later than the end of the first working day of the release at:
    - In-state: 888-331-6337
    - Out of state: 775-687-9485

For (1) through (3) above, Ormat would have the source of spill repaired at the earliest practical time, and continue working crews and equipment on cleanup until all concerned agencies are satisfied.

e. Confirm telephone notification to agencies and regulatory bodies. Telephone notification shall be confirmed by the Ormat Project Manager in writing within two weeks of telephone notification.

Written confirmation would contain:
(1) Reason for the discharge or spillage.
(2) Duration and volume of discharge or spillage.
(3) Steps taken to correct problem.
(4) Steps taken to prevent recurrence of problem.

(b) If we require, you must also describe how you would monitor your facility operations to ensure they comply with the requirements of 43 CFR 3200.4, and noise, air, and water quality standards at all times. We would consult with another involved surface

management agency regarding monitoring requirements. You must also include provisions for monitoring other environmental parameters we may require.

Ormat would provide compliance measures upon request.

(c) Based on what level of impacts your operations may cause, we may require you to collect data concerning existing air and water quality, noise, seismicity, subsidence, ecological systems, or other environmental information for up to one year before you begin operating. We must approve your data collection methodologies, and would consult with any other surface managing agency involved.

Ormat would collect and provide appropriate, additional environmental data if required.

(d) You must also describe how you would abandon utilization facilities and restore the site, to comply with the requirements of 43 CFR 3200.4.

The estimated life of the Project is 50 years.

Once drilling is complete, approximately half of the drill pad area can be reclaimed, but the remaining half must be kept clear for ongoing operations and the potential need to work on or re-drill the well. The portions of the cleared well sites not needed for operational and safety purposes would be recontoured to a final or intermediate contour that would blend with the surrounding topography as much as possible. Areas able to be reclaimed will be ripped, tilled, or disked on contour, as necessary and reseeded with native grasses and forbs. The stockpiled topsoils will also be spread on the area to aid in revegetation.

At the end of Project operations the wells would be plugged and abandoned as required by Nevada Division of Water Resources (NDWR) regulations. Abandonment typically involves filling the well bore with clean, heavy abandonment mud and cement until the top of the cement is at ground level, which is designed to ensure that fluids would not move across these barriers into different aquifers. The well head (and any other equipment) would then be removed, the casing cut off well below ground surface and the hole backfilled to the surface.

Reclamation of the roads would include recontouring the road back to the original contour, seeding, controlling noxious weeds and may include other techniques to improve reclamation success, such as ripping, scarifying, replacing topsoil, pitting and mulching.

Pipeline reclamation would include placing fill in the trench, compacting the fill, regarding cut-and-fill slopes to restore the original contour, replacing topsoil and revegetating in accordance with a reclamation plan.

All other above-ground facilities and areas of surface disturbance associated with geothermal development would be removed and reclaimed.

Ultimately, Ormat would prepare for NDWR approval, and then implement, a site reclamation plan. The plan would address restoring the surface grades, surface drainage and revegetation of cleared areas. largely as described above. Stormwater diversion would remain in place until successful revegetation is attained.

(e) Finally, submit any additional information or data which we may require.

Ormat would provide appropriate additional information upon request.

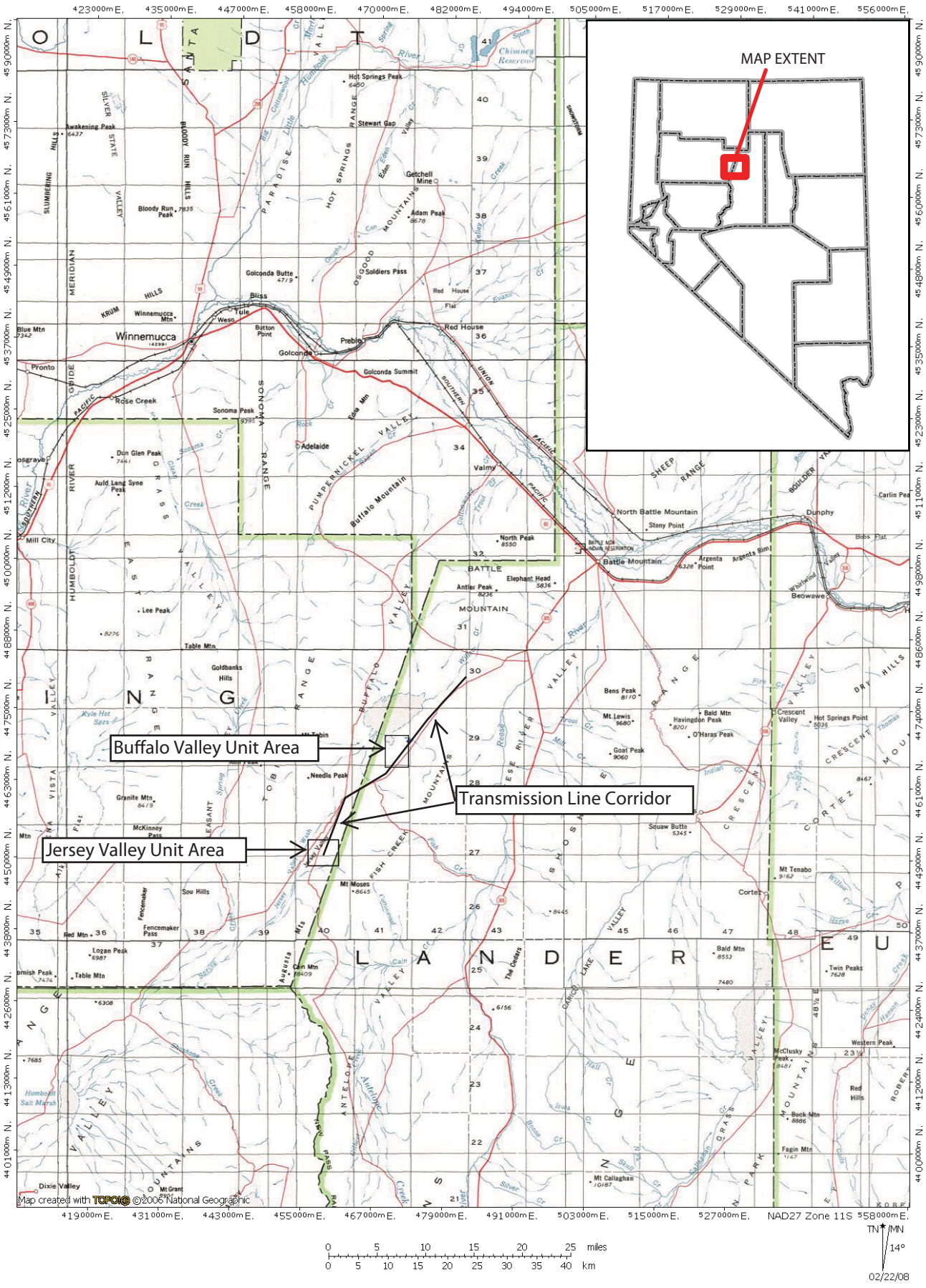


Figure 1: Project Vicinity Map

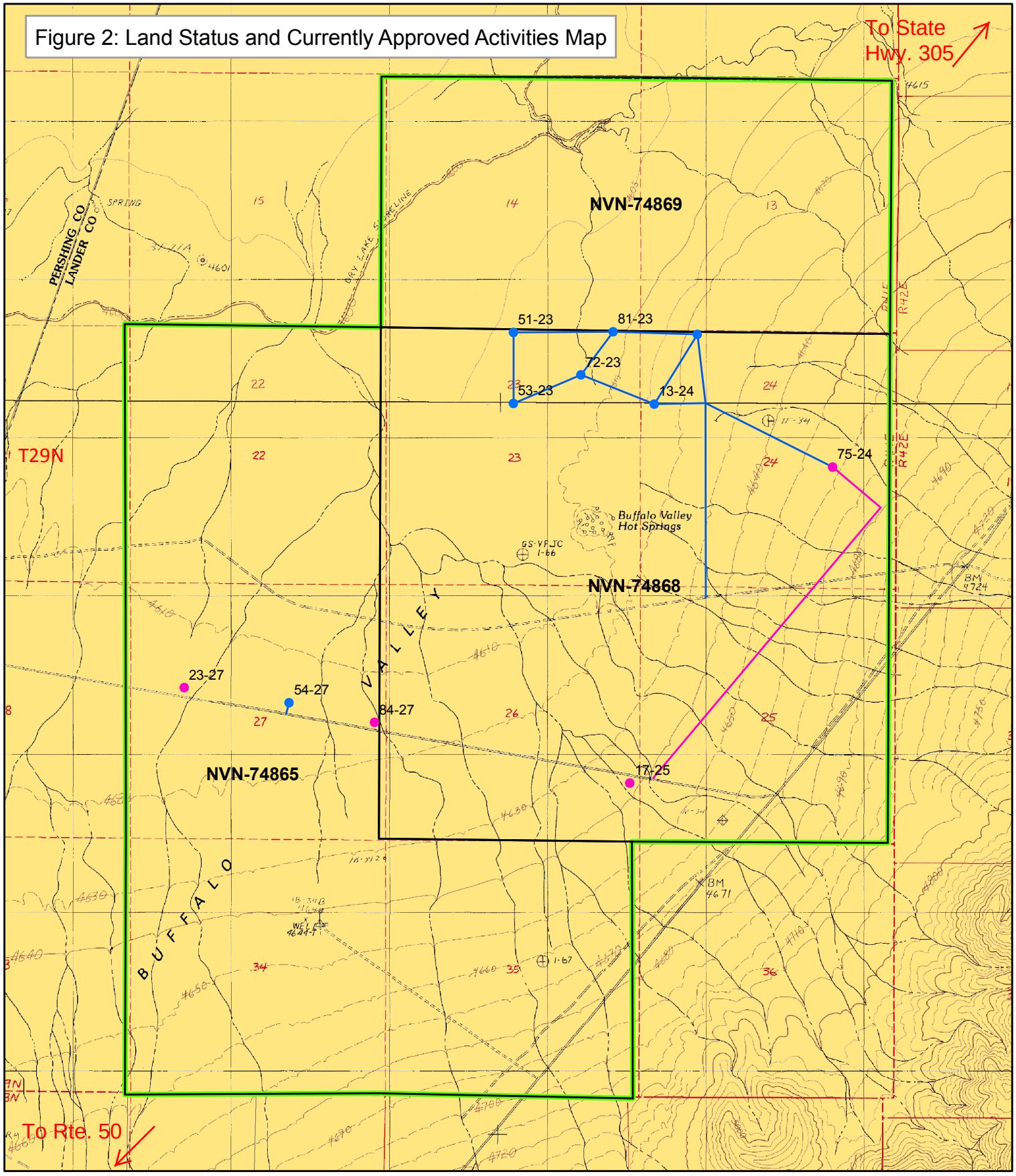


Figure 2: Land Status and Currently Approved Activities Map
To State Hwy. 305
NVN-74869
NVN-74868
NVN-74865
51-23
81-23
72-23
53-23
13-24
75-24
17-25
23-27
54-27
84-27
T29N
R42E
Buffalo Valley Hot Springs
BUFFALO VALLEY
PERSHING CO
LANDER CO
To Rte. 50
LEGEND
Previously Approved Sites (2006)
Previously Approved Sites (2008)
Previously Approved Access (2006)
Previously Approved Access (2008)
Lease Boundary
Buffalo Valley Geothermal Unit Boundary
Bureau of Land Management Lands
N
W
E
S
0
0.3
0.6
1.2 Miles
ORMAT
Map Date: 04/01/09

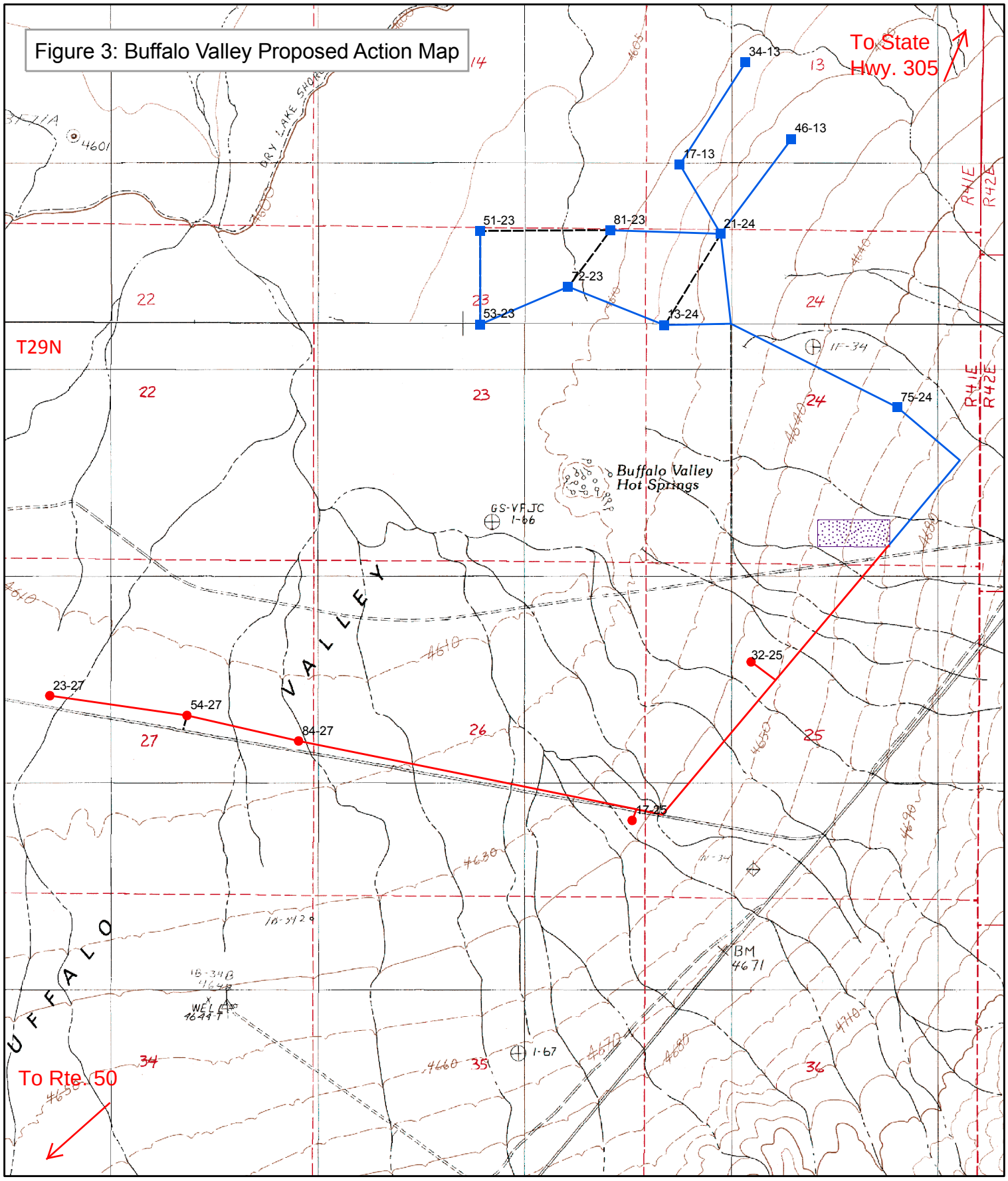
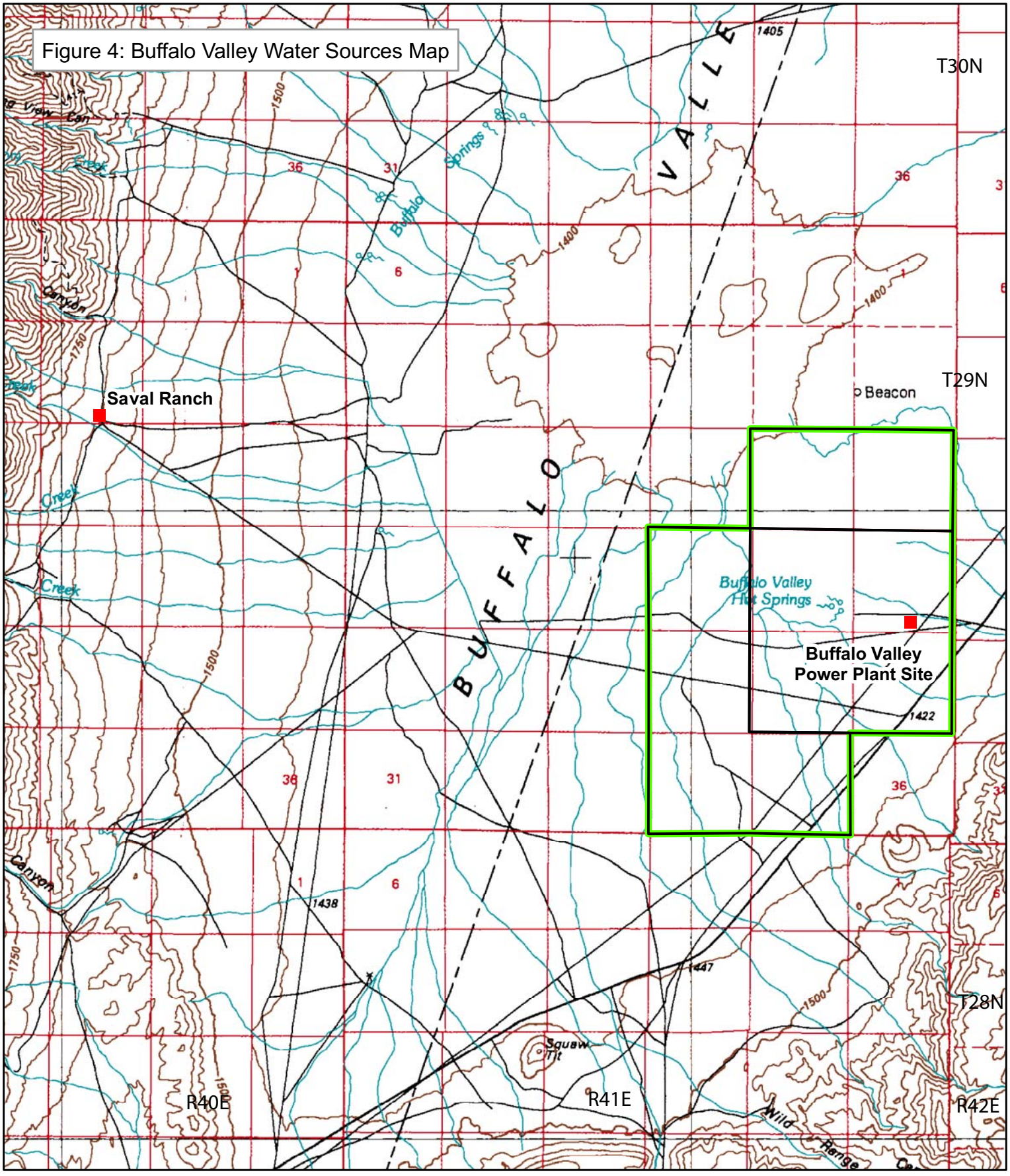


Figure 3: Buffalo Valley Proposed Action Map
To State Hwy. 305
To Rte. 50
34-13
46-13
17-13
51-23
81-23
21-24
72-23
53-23
13-24
75-24
32-25
23-27
54-27
84-27
47-25
Buffalo Valley Hot Springs
BUFFALO VALLEY
DRY LAKE SHORE
T29N
R41E
R42E
22
23
24
25
26
27
34
35
36
13
14
GS-VFJC
I-66
I-67
BM 4671
LEGEND
Injection Well
Production Well
Injection Pipeline
Production Pipeline
Proposed Power Plant Location
Existing Access
Intermittent Stream
N
W
E
S
0
0.2
0.4
0.8 Miles
ORMAT
Map Date: 11/30/09



LEGEND

- Possible Water Sources
- Buffalo ValleyLease Boundary
- Buffalo Valley Geothermal Unit Boundary
- Intermittent Stream

N
W E
S

0 0.5 1 2 Miles

ORMAT

Map Date: 11/30/09

REVISED
OPERATIONS PLAN

JERSEY VALLEY
GEOTHERMAL DEVELOPMENT PROJECT

PERSHING AND LANDER COUNTIES, NEVADA

APRIL 2009
REVISED FEBRUARY 2010
REVISED MARCH 2010
REVISED APRIL 2010

PROJECT APPLICANT:

ORMAT NEVADA, INC.
6225 NEIL ROAD
RENO, NEVADA 89511-1163

JERSEY VALLEY
GEOTHERMAL DEVELOPMENT PROJECT

REVISED
OPERATIONS PLAN
§3261.12

Ormat Nevada, Inc. (Ormat) is proposing to construct, operate, and maintain the Jersey Valley Geothermal Development Project (Project), in Pershing and Lander Counties, Nevada (see Figure 1). The Project would include the construction and operation of a power generation facility, geothermal production and injection well pads and wells, access roads, geothermal fluid pipelines, an electrical transmission line and ancillary support facilities.

This Operations Plan is for the drilling and testing of geothermal wells within the Jersey Valley Geothermal Unit (NVN-83483X). The Unit area (Jersey Valley Project area) is comprised of federal geothermal leases NVN-77483, NVN-74881, NVN-77481, NVN-77482 and NVN-74883, in Sections 15-16, 20-22, 27-29 and 32-34 in Township 27 North, Range 40 East (T27N, R40E), Mount Diablo Baseline and Meridian (MDB&M), and the entirety of Section 3 and portions of Sections 4 and 5, T26N, R40E, MDB&M (see Figure 2).

The site is accessed by traveling south on State Route 305 from Battle Mountain approximately 11.5 miles to Copper Basin Road. Turn right onto Copper Basin Road and travel southwest for approximately 11 miles. Continue onto County Road 121 for approximately 12 miles. County Road 121 becomes Jersey Valley Road. Continue on Jersey Valley Road for approximately 8 miles. Turn left onto an unnamed dirt road traveling southeast and traverse for approximately 1.5 miles and proceed to the signed area on the west side of the road.

Within the Jersey Valley Project Area, 18 geothermal well locations were selected (shown in Figure 3 and identified in Table 1).

Table 1: Jersey Valley Well Locations

Well Name (Modified Kettleman No.)	Lease Number	Township/ Range	Legal Description (Section Number & Aliquot Part)	Approximate UTM Coordinates (NAD83)	
				Easting (m)	Northing (m)
87-28	NVN-74881	T27N, R40E	SE1/4, SE1/4 Section 28	459431	4447727
26-27	NVN-77483	T27N, R40E	NW1/4, SW1/4 Section 27	459887	4448007
85-28	NVN-74881	T27N, R40E	NE1/4, SE1/4 Section 28	459451	4448136
66-28	NVN-74881	T27N, R40E	NW1/4, SE1/4 Section 28	459015	4447970
47-28	NVN-74881	T27N, R40E	SE1/4, SW1/4 Section 28	458640	4447688
78-28	NVN-74881	T27N, R40E	SE1/4, SE1/4 Section 28	459284	4447537
81-33	NVN-74883	T27N, R40E	NE1/4, NE1/4 Section 33	459495	4447320
17-28	NVN-74881	T27N, R40E	SW1/4, SW1/4 Section 28	457958	4447694
57-28	NVN-74881	T27N, R40E	SW1/4, SE1/4 Section 28	458813	4447803
68-28	NVN-74881	T27N, R40E	SW1/4, SE1/4 Section 28	458972	4447645
27-27	NVN-77483	T27N, R40E	SW1/4, SW1/4 Section 27	459796	4447750
85A-28	NVN-74881	T27N, R40E	NE1/4, SE1/4 Section 28	459390	4448078
46-28	NVN-74881	T27N, R40E	NE1/4, SW1/4 Section 28	458717	4447945
36-28	NVN-74881	T27N, R40E	NE1/4, SW1/4 Section 28	458371	4447881

Well Name (Modified Kettleman No.)	Lease Number	Township/ Range	Legal Description (Section Number & Aliquot Part)	Approximate UTM Coordinates (NAD83)	
				Easting (m)	Northing (m)
76-28	NVN-74881	T27N, R40E	NE1/4, SE1/4 Section 28	459424	4447897
27-22	NVN-77483	T27N, R40E	SW1/4, SW1/4 Section 22	459794	4449360
22-27	NVN-77483	T27N, R40E	NW1/4, NW1/4 Section 27	459768	4448766
14-34	NVN-77483	T27N, R40E	SW1/4, NW1/4 Section 34	459641	4446697

The contents of this Operations Plan are organized as requested in 43 CFR 3261.12, as detailed below.

§ 3261.12 What is an operations plan?

An operations plan describes how you will drill for and test the geothermal resources covered by your lease. Your plan must tell BLM enough about your proposal to allow us to assess the environmental impacts of your operations. This information should generally include:

(a) Well pad layout and design:

Each well pad would be about 400 feet by 450 feet, and disturb an area of about 180,000 square feet (approximately 4.1 acres). A typical well pad site layout is provided as Figure 5. Actual dimensions of each drill pad would be modified to best match the specific physical and environmental characteristics of the site and to minimize grading (cut and fill).

The estimated maximum total area of new surface disturbance required for the 18 Jersey Valley well pads would be about 73.80 acres (approximately 4.1 acres per pad * 18 pads).

Each drill pad would be prepared to create a level pad for the drill rig and a graded surface for the support equipment. Storm water runoff from undisturbed areas around the constructed drill pads would be directed into ditches surrounding the drill pad and back onto undisturbed ground consistent with best management practices for storm water. The site would be graded to prevent the movement of storm water from the pad off of the constructed site, and has been designed for a 100 year storm.

Fenced reserve pits would be constructed in accordance with best management practices identified in the “Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development (The Gold Book)” (Fourth Edition – 2007) on each pad for the containment and temporary storage of water, drill cuttings and waste drilling mud during drilling operations. To prevent access by persons, wildlife, or livestock, reserve pits would be fenced with an exclosure fence on three sides and then fenced on the fourth side once drilling has been completed (see **Figure 6**). The fence would remain in place until pit reclamation begins. For the drilling of each well, the reserve pit would measure approximately 75 feet by 200 feet by up to 10 feet deep.

Once drilling is complete, approximately half of this drill pad area can be reclaimed, but the remaining half must be kept clear for ongoing operations and the potential need to work on or re-drill the well. Areas able to be reclaimed will be reseeded with native grasses and forbs. The stockpiled topsoils will also be spread on the area to aid in revegetation (see also Section (g) below).

(b) A description of existing and planned access roads

The Project site is accessed by traveling south on State Route 305 from Battle Mountain approximately 11.5 miles to Copper Basin Road. Turn right onto Copper Basin Road and travel southwest for approximately 11 miles. Continue onto County Road 121 for approximately 12 miles. County Road 121 becomes Jersey Valley Road. Continue on Jersey Valley Road for approximately 8 miles. Turn left onto an unnamed dirt road traveling southeast and traverse for approximately 1.5 miles and proceed to the signed area on the west side of the road.

Ormat has reached an agreement with Pershing County in which Ormat has agreed to a specified dollar amount necessary to repair, upgrade and maintain the County road. Additionally, Ormat has had conversations with Lander County and verbally agreed to compensate the County for road maintenance at their request.

To access the drill sites, new roads with a 15-foot wide road bed would be constructed using a dozer and/or road grader. New access roads would be required as follows (see Figure 3):

- About 725 feet of new road would be constructed to 27-22 (from the existing road);
- About 335 feet of new road would be constructed to 22-27 (from the existing road);
- About 840 feet of new road would be constructed to 26-27 (from the existing road);
- About 500 feet of new road would be constructed to 14-34 (from the existing road);
- About 1,260 feet of new road would be constructed to 81-33 (from the existing road);
- About 990 feet of new road would be constructed between 81-33 and 78-28;
- About 1,085 feet of new road would be constructed between 78-28 and 68-28;
- About 735 feet of new road would be constructed between 68-28 and 57-28;
- About 580 feet of new road would be constructed to 17-28 (from the existing road);
- About 1,545 feet of new road would be constructed between 17-28 and 36-28;
- About 1,155 feet of new road would be constructed between 36-28 and 46-28;
- About 985 feet of new road would be constructed between 46-28 and 66-28;
- About 1,275 feet of new road would be constructed between 66-28 and 85A-28;
- About 280 feet of new road would be constructed between 85A-28 and 85-28;
- About 680 feet of new road would be constructed between 47-28 and 57-28;
- About 745 feet of new road would be constructed between 87-28 and 18A-27;
- About 615 feet of new road would be constructed between 46-28 and 57-28;
- About 1,345 feet of new road would be constructed to 57-28 (from the existing road);
- About 350 feet of new road would be constructed to 87-28 (from the existing road);
- About 200 feet of new road would be constructed to 27-27 (from the existing road); and
- About 215 feet of new road would be constructed to 85A-28 (from the power plant);

The total estimated area of surface disturbance required for new access road construction, assuming a 20-foot wide area of disturbance would be about 7.99 acres.

Constructed access roads crossing existing drainages may require installation of culverts. Culvert installation would follow BLM design criteria and would be constructed pursuant to standards established in the Gold Book (Fourth Edition – Revised 2007).

Water would be applied to the ground during the construction and utilization of the access roads as necessary to control fugitive dust (see also Section (h) below).

(c) A description of any ancillary facilities;

Each well would be drilled with a large rotary drill rig. During drilling, the top of the drill rig mast could be as much as 170 feet above the ground surface. The typical drill rig and associated support equipment (rig floor and stands; draw works; mast; drill pipe; trailers; mud, fuel and water tanks; diesel generators; air compressors; etc.) would be brought to the prepared pad on 25 or more large tractor-trailer trucks. Additional equipment and supplies would be brought to the drill site during ongoing drilling and testing operations.

As many as ten or more tractor-trailer truck trips would be generated on the busiest day, although on average about two to three large tractor-trailer trucks (delivering drilling supplies and equipment), and about eight small trucks/service vehicles/worker vehicles, would be driven to the site each day throughout the typical 45-day drilling process. Difficulties encountered during the drilling process, including the need to work over or to re-drill the hole, could double the time necessary to successfully complete an exploration well. Drilling would be conducted 24-hours per day, 7-days per week by a crew of nine to ten workers. During short periods, the number of workers on site during drilling would be as high as 18.

The drilling supervisor and mud logger would typically sleep in a trailer on the active drill site while the well is being drilled. The drilling crew may also live “on site” during the drilling operations in a self-contained “bunkhouse” (sleeping quarters, galley, water tank and septic tank) or portable trailers which would be placed on one of the drill sites not being actively drilled to accommodate the drill rig workers.

(d) The source of drill pad and road building material;

Drill pad preparation activities would include clearing, earthwork, drainage and other improvements necessary for efficient and safe operation and for fire prevention. Only those drill pads scheduled to be drilled would be cleared. Clearing would include removal of organic material, stumps, brush and slash, which would be removed and taken to an appropriate dump site. Topsoil would be stripped (typically to the rooting depth) and salvaged during the construction of all pads and new access roads, as feasible. Salvaged topsoil would be stockpiled on the pads for use during subsequent reclamation of the disturbed areas.

Drill pad and road building material (gravel) would be obtained from an established aggregate pit in NE1/4, SE1/4, Section 21, T27N, R40E (see Figure 3). Additionally, the existing pit would be expanded approximately 5.5 acres to the southeast (SW1/4, SW1/4 Section 22, T27N, R40E) to accommodate the Project’s aggregate needs.

Drill pads are site specific and selected to minimize the need for aggregate application. At most, each drill pad (exclusive of the reserve pit) would be covered with up to 4 inches of gravel (approximately 2,000 cubic yards/pad * 18 pads totals 36,000 cubic yards).

Up to 4 inches of gravel would be applied to the improved access roads, as necessary, to create an all-weather surface (7.99 miles of new roads * 4 inches of aggregate totals approximately 4,250 cubic yards).

Total aggregate required for the well pad and access road construction is estimated at 40,250 cubic yards (36,000 cubic yards for pad construction plus 4,250 cubic yards for road construction).

(e) The water source;

Water required for well drilling could range up to as much as 30,000 gallons per day. Water requirements for grading, construction, and dust control would average substantially less. One or more portable water tank(s) holding a combined total of at least 10,000 gallons would be maintained on the well sites during drilling operations.

Water necessary for these activities would be obtained from established private ranch sources: Home Station Ranch (NW1/4 Section 7, T26N, R40E) and McCoy Ranch (SE1/4 Section 29, T26N, R39E). Water from these sources would be trucked to each construction or drill site (see Figure 4). Additional water may be obtained from a well owned by the Saval Ranch Company on private lands within the Jersey Valley unit (NW/14, SW1/4 Section 34, T27N R40E) and piped to the power plant site. The temporary construction water pipeline would be laid on the side of the existing roads and no additional surface disturbance is anticipated.

(f) A statement describing surface ownership;

The Jersey Valley geothermal unit (NVN-83483X) is comprised of federal geothermal leases NVN-77483, NVN-74881, NVN-77481, NVN-77482 and NVN-74883 (see Figure 2).

(g) Plans for surface reclamation;

After the well drilling and testing operations are completed, the liquids from the reserve pits would either naturally evaporate or be removed as may be necessary to reclaim the reserve pits. The solid contents remaining in each of the reserve pits, typically consisting of non-hazardous, non-toxic drilling mud and rock cuttings, would be tested to confirm that they are not hazardous. Typical tests may include the Toxicity Characteristic Leaching Procedure (TCLP) (EPA Method 1311), tested for heavy metals; pH (EPA method 9045D); Total Petroleum Hydrocarbons/Diesel (EPA Method 8015B); and Oil and Grease (EPA Method 413.1). If the test results indicate that these solids are non-hazardous, the solids would then be mixed with the excavated rock and soil and buried by backfilling the reserve pit.

If a well is judged by Ormat to have no commercial potential, it may continue to be monitored, but would eventually be plugged and abandoned in conformance with the well abandonment requirements of the BLM and NDOM. Abandonment typically involves filling the well bore with clean, heavy abandonment mud and cement until the top of the cement is at ground level, which is designed to ensure that fluids would not move across these barriers into different aquifers. The well head (and any other equipment) would then be removed, the casing cut off well below ground surface and the hole backfilled to the surface.

Following the abandonment of a well, the access road(s) and well pad constructed as part of the Operations Plan would be reclaimed. Each well pad and constructed road would be disked and graded, if necessary, to de-compact the soil, turn under any applied gravel, and restore grade (if necessary), and the stockpiled topsoil (if any) would be placed back over the disturbed areas.

(h) A description of procedures to protect the environment and other resources;

Ormat would comply with all special lease stipulations attached to the federal geothermal leases which are applicable to Project operations on these leases. In addition, Ormat would implement the following additional environmental protection measures:

- Water would be applied to the ground during the construction and utilization of the drill pads and access roads as necessary to control dust.
- Portable chemical sanitary facilities would be available and used by all personnel during periods of well drilling and/or flow testing. These facilities would be maintained by a local contractor.

(i) Any other information we may require.

Well Drilling

The wells would each be drilled and cased to a design depth of approximately 7,000 feet, or the depth selected by the project geologist. Blow Out Prevention Equipment (BOPE), which is typically inspected and approved by the BLM and Nevada Division of Minerals (NDOM), would be utilized while drilling below the surface casing. During drilling operations, a minimum of 10,000 gallons of cool water and 12,000 pounds of inert, non-toxic, non-hazardous barite (barium sulfate) would likely be stored at each well site for use in preventing uncontrolled well flow ("killing the well"), as necessary.

The well bore would be drilled using non-toxic, temperature-stable drilling mud composed of a bentonite clay-water or polymer-water mix for all wells. Variable concentrations of additives would be added to the drilling mud as needed to prevent corrosion, increase mud weight, and prevent mud loss. Some of the mud additives may be hazardous substances, but they would only be used in low concentrations that would not render the drilling mud toxic. Additional drilling mud would be mixed and added to the mud system as needed to maintain the required quantities.

In the event that very low pressure areas are encountered, compressed air may be added to the drilling mud, or used instead of drilling mud, to reduce the weight of the drilling fluids in the hole and assist in carrying the cuttings to the surface. The air, any drilling mud, rock cuttings, and any reservoir fluids brought to the surface would be diverted through a separator/muffler to separate and discharge the air and water vapor to the air and the drilling mud and cuttings to the reserve pit.

Each well may need to be worked over or redrilled if mechanical or other problems are encountered while drilling or setting casing which prevent proper completion of the well in the targeted geothermal reservoir or if the well does not exhibit the anticipated permeability, productivity or injectivity. Depending on the circumstances encountered, working over a well may consist of lifting the fluid in the well column with air or gas or stimulation of the formation using dilute acid or rock fracturing techniques. Well redrilling may consist of either: 1) reentering and redrilling the existing well bore; 2) reentering the existing well bore and drilling and casing a new well bore; or 3) sliding the rig over a few feet on the same well pad and drilling a new well bore through a new conductor casing.

Flow Testing

Once the slotted liner has been set in the bottom of the well bore, and while the drill rig is still over the well, the residual drilling mud and cuttings would be flowed from the well bore and discharged to the reserve pit. This may be followed by one or more short-term flow tests. Each test, lasting approximately 3 to 5 days on average, would consist of flowing the well into the reserve pit or portable steel tanks brought onto the well site while monitoring geothermal fluid

temperatures, pressures, flow rates, chemistry and other parameters. An "injectivity" test may also be conducted by injecting the produced geothermal fluid from the reserve pit or steel tanks back into the well and the geothermal reservoir. The drill rig would likely be moved from the well site following completion of these short-term test(s). Each short-term well test is expected to flow approximately 1.5 million gallons.

One or more long-term flow test(s) of each well drilled would likely be conducted following the short-term flow test(s) to more accurately determine long-term well and geothermal reservoir productivity. The long-term flow test(s), each lasting between 7-30 days, would be conducted by either pumping the geothermal fluids from the well through onsite test equipment closed to the atmosphere (using a line shaft turbine pump or electric submersible pump), or allowing the well to flow naturally to the surface, where the produced steam and non-condensable gases (including any hydrogen sulfide), separated from the residual geothermal fluid, would be discharged into the atmosphere. In either case, a surface booster pump would then pump the residual produced geothermal fluid to the constructed reserve pit. The onsite test equipment would include standard flow metering, recording, and sampling apparatus Each long-term well test is expected to flow approximately 15 million gallons.

A surface booster pump would then pump the residual produced geothermal water/fluid from the reserve pit through a temporary 8" to 10" diameter pipeline to either inject the fluid into one of the other geothermal wells drilled within the Project area or to the reserve pit on another well pad. The temporary pipeline would either be laid "cross-country" or on the surface of the disturbed shoulders on the access roads connecting the geothermal full-size wells (as required, roads would be crossed by trenching and burying the temporary pipe in the trench). The onsite test equipment would include standard flow metering, recording, and sampling apparatus.

Emergency Contingency Plans

A. Injury Contingency Plan

Drilling operators are required by law to safety train workers and to have first aid equipment on site. Ormat supervises the drilling operations to ensure that all safety procedures and best safety practices are in place and adhered to throughout the drilling program. Ormat's contract with the drilling company specifies that safety regulations are implemented and adhered to by the drilling contractor, and that the operation is in compliance with all existing laws pertaining to safety and environmental protection. Safety meetings are held prior to any major operation, such as running casing, cementing, or unloading the well. Drilling contractors would typically have daily safety meeting with crews and review any issues that could come up during the 12 hours that each crew is at work.

In the event injuries occur in connection with an Ormat Nevada Inc. (Ormat) operation, specific and immediate attention would be given to proper transportation to a medical facility.

Ambulance (911)

Battle Mountain Ambulance Service

25 E. 2nd Street	(or)	550 W. 2nd Street
Battle Mountain, NV		Battle Mountain, NV
(775) 635-1111		(775) 635-2190

Battle Mountain General Hospital

535 S. Humboldt
Battle Mountain, NV
(775) 635-2550

Lander County Sheriff Department
(775) 635-1100

B. Fire Contingency Plan

1. Any small fires which occur around the well pad during drilling and/or testing operations should be able to be controlled by rig personnel utilizing on-site firefighting equipment.

2. The BLM Battle Mountain District Office (775.635.4000) would be notified of any wildland fire, even if the available personnel can handle the situation or the fire poses no threat to the surrounding area. Additionally, the Central Nevada Interagency Dispatch (CNIDC) would be notified (775.623.1555 during business hours, 775.623.3444 after business hours).

3. A roster of emergency phone numbers would be available onsite so that the appropriate firefighting agency can be contacted in case of a fire.

4. All vehicles shall carry at a minimum a shovel and five gallons of water (preferably in a backpack pump), in addition to a conventional fire extinguisher.

5. Adequate fire fighting equipment (a shovel, a pulaski, standard fire extinguisher(s), and an ample water supply) shall be kept readily available at each active drill site.

6. Vehicle catalytic converters (on vehicles that would enter and leave the drill site on a regular basis) shall be inspected often and cleaned of all flammable debris.

7. All cutting/welding torch use, electric-arc welding, and grinding operations shall be conducted in an area free, or mostly free, from vegetation. An ample water supply and shovel shall be on hand to extinguish any fires created from sparks. At least one person in addition to the cutter/welder/grinder shall be at the work site to promptly detect fires created by sparks.

8. Personnel would be responsible for being aware of and complying with the requirements of any fire restrictions or closures issued by the BLM Battle Mountain District Office, as publicized in the local media or posted at various sites throughout the field office district.

C. Spill or Discharge Contingency Plan

1. Potential Sources of Accidental Spills or Discharges
   a. Geothermal Fluid
      Accidental geothermal fluid spills or discharges are very unlikely because the hole would be cased and blowout prevention equipment would be utilized. However, accidental discharges or spills could result from any of the following:
      (1) Loss of well control (blowout);
      (2) Pipeline leak or rupture;
      (3) Leakage from test tank

   b. Drilling Muds

Muds are a mixture of water, non-toxic chemicals and solid particles used in the drilling operations to lubricate and cool the bit in the hole, to carry cuttings out of the hole, to maintain the hole condition and to control formation pressure. Drilling muds are prepared and stored in metal tanks at the drilling site. Waste drilling mud and cuttings are discharged into the reserve pit, which is open and is adequately sized to hold the volume necessary for the operation. Accidental discharges of drilling mud are unlikely, but could occur by:

(1) overflow of the reserve pit;
(2) reserve pit wall seepage or wall failure;
(3) discharge from equipment failure on location; or
(4) shallow lost circulation channeling to the surface.

c. Lubricating or Fuel Oils and Petroleum Products

A discharge of this type would probably be very small and be from equipment used in the field. To minimize the potential for spills, all petroleum products on site are labeled, stored and handled in conformance with applicable federal and state requirements. All materials except diesel fuel are stored in the original shipping containers. Diesel fuel is stored in on-board tanks on the drill rig and replenished from a bulk tank truck using an electric transfer pump and hard lines. Supervisors trained in spill prevention, containment and clean-up are on-site 24 hours a day. Potential locations for accidental spills are:

(1) drilling equipment and machinery at and around the drilling location;
(2) other miscellaneous equipment and machinery at well site and roads;
(3) storage areas; and
(4) equipment servicing areas.

d. Construction/Maintenance Debris

Trash shall be contained on-site and hauled to an approved landfill. Burial of trash on-site shall not be permitted.

2. Plan for Cleanup and Abatement

In the event of discharge of formation fluids, drilling muds or petroleum products, the person responsible for the operation would make an immediate investigation, then contact the Drilling Supervisor and advise him of the spill. The Drilling Supervisor would in turn call out equipment, regulate field operations, or do other work as applicable for control and clean up of the spill, as follows:

a. Action - Small, Containable Spill

If the spill is small (i.e., less than 25 gallons) and easily containable without endangering the watershed, the Drilling Supervisor would direct and supervise complete cleanup and return to normal operations.

b. Action - Large or Uncontainable Spill

If the spill is larger than 25 gallons, or is not easily contained, or endangers, or has entered, the watershed, the Drilling Supervisor would proceed to take necessary action to curtail, contain and cleanup the spill, as above, and notify personnel as listed below.

c. Notification

(1) The Drilling Supervisor would, as quickly as practicable:

- Call out contractor(s), as required.
- Notify the Ormat Project Manager.
- Notify the local and state law enforcement agencies if the public safety is threatened.

(2) The Ormat Project Manager would notify the following as soon as practical and work closely with them in all phases of the curtailment, containment and cleanup operations:

Division of Minerals	NDEP
State of Nevada	Division of Emergency Management
400 W. King	901 S. Stewart Street
Carson City, NV 89703	Carson City, NV 89706
775.684.7040	775.688.2830 or 888.331.6337

BLM, Battle Mountain District Office
(within 24 hours of the knowledge of a reportable release)
50 Bastian Road
Battle Mountain, Nevada 89820
775.635.4000

National Response Center
800.424.8802

The Drilling Supervisor would also advise local population and affected property owners if spill affects residents or property.

d. Specific Procedures

(1) For geothermal fluid spills:

- Contain spillage with dikes if possible and haul to disposal site by vacuum or water trucks or dispose of in a manner acceptable to the Division of Minerals and Bureau of Land Management.

(2) For drilling mud:

- Repair reserve pit or contain with dikes. Haul liquid to another reserve pit, available tanks or approved disposal site.

(3) For petroleum products:

- Contain spill with available manpower. Use absorbents and dispose of same in approved disposal area.
- Spills of petroleum products in excess of 25 gallons must be reported to the Nevada Division of Environmental Protection as soon as possible, but no later than the end of the first working day of the release at:
    - In-state: 888-331-6337
    - Out of state: 775-687-9485

For (1) through (3) above, Ormat would have the source of spill repaired at the earliest practical time, and continue working crews and equipment on cleanup until all concerned agencies are satisfied.

e. Confirm telephone notification to agencies and regulatory bodies. Telephone notification shall be confirmed by the Ormat Project Manager in writing within two weeks of telephone notification.

Written confirmation would contain:

(1) Reason for the discharge or spillage.
(2) Duration and volume of discharge or spillage.
(3) Steps taken to correct problem.
(4) Steps taken to prevent recurrence of problem.

D. Hydrogen Sulfide Contingency Plan

1. Although there is very little chance that drilling in these moderate-temperature geothermal reservoirs would encounter substantial hydrogen sulfide, continuous hydrogen sulfide monitors would be on the rig floor and at the mud tanks and shaker to alert workers should elevated hydrogen sulfide levels be detected. Self contained air packs would be on site for use by workers in an emergency. Signs would be posted to inform workers and visitors of any potential issues.

2. Drilling parameters would be continuously monitored, and any changes in gas concentrations, formation pressures, or potential for flow are provided to the driller and supervisor. The BOPE would be in place to shut off any unexpected gas flows. In the event of any evidence of high gas concentrations are detected in the drilling fluids, the drilling fluids consultant would obtain materials and design a program to safely circulate out the gas bubble and to treat and remove any hydrogen sulfide using caustic soda, caustic soda and peroxide or other technology as appropriate.

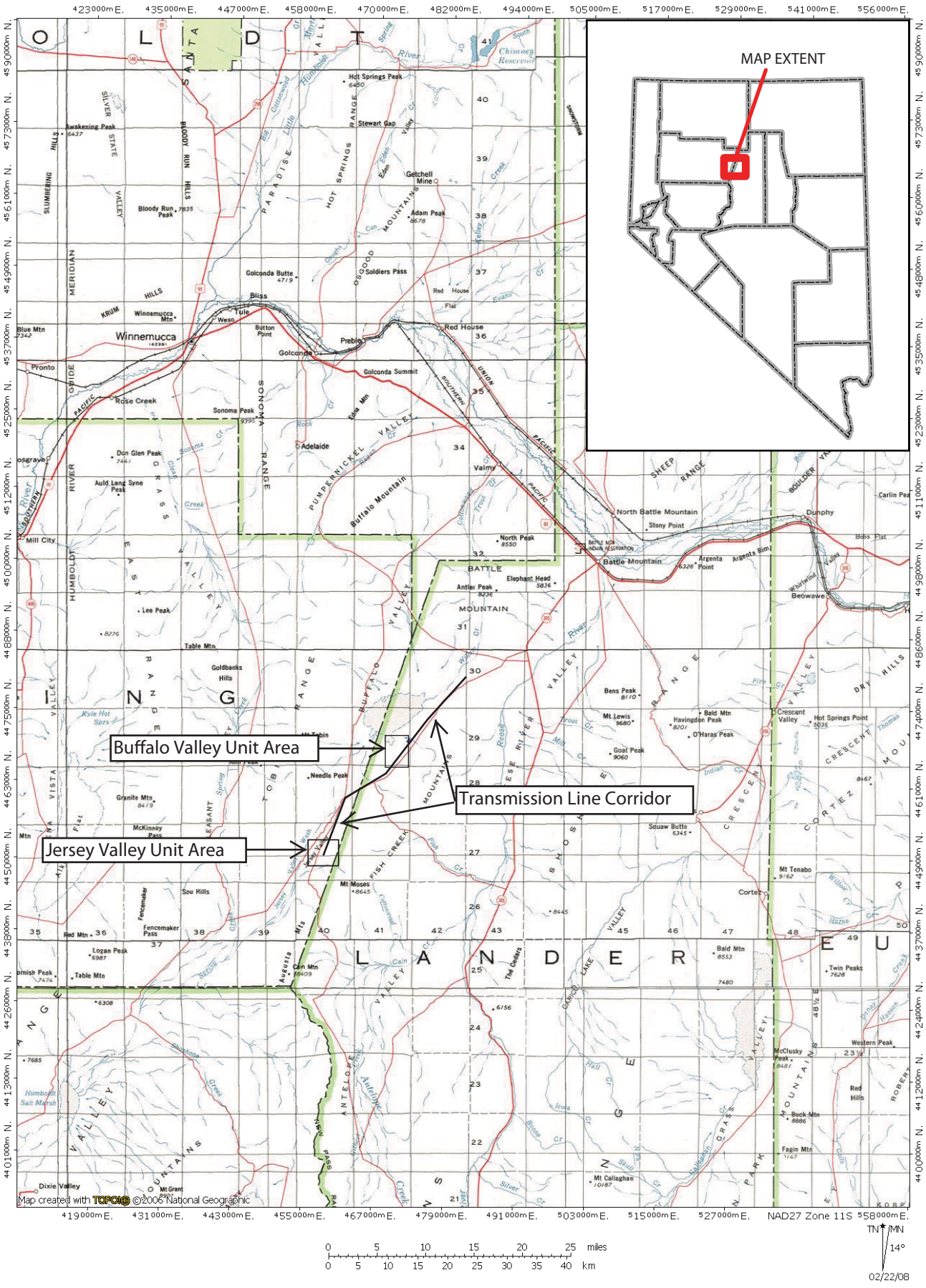
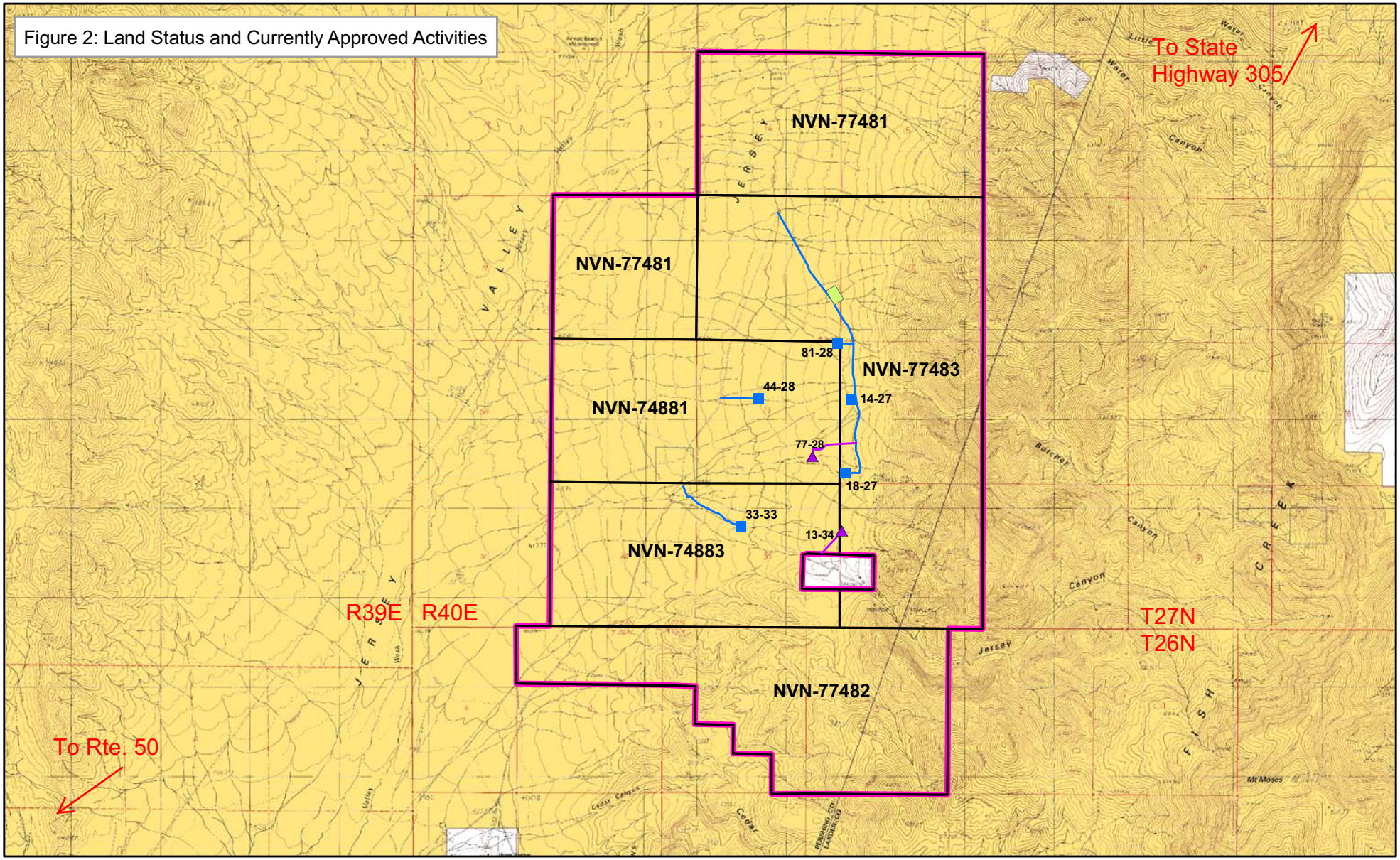


Figure 1: Project Vicinity Map

Figure 2: Land Status and Currently Approved Activities



LEGEND

- Previously Approved Well Site (2007)
- Previously Approved Well Site (2008)
- Previously Approved Access Road (2007)
- Previously Approved Access Road (2008)
- Approved Gravel Source
- Geothermal Lease Boundary
- Jersey Valley Geothermal Unit Area (NVN-83483X)
- Bureau of Land Management Land
- Private Land

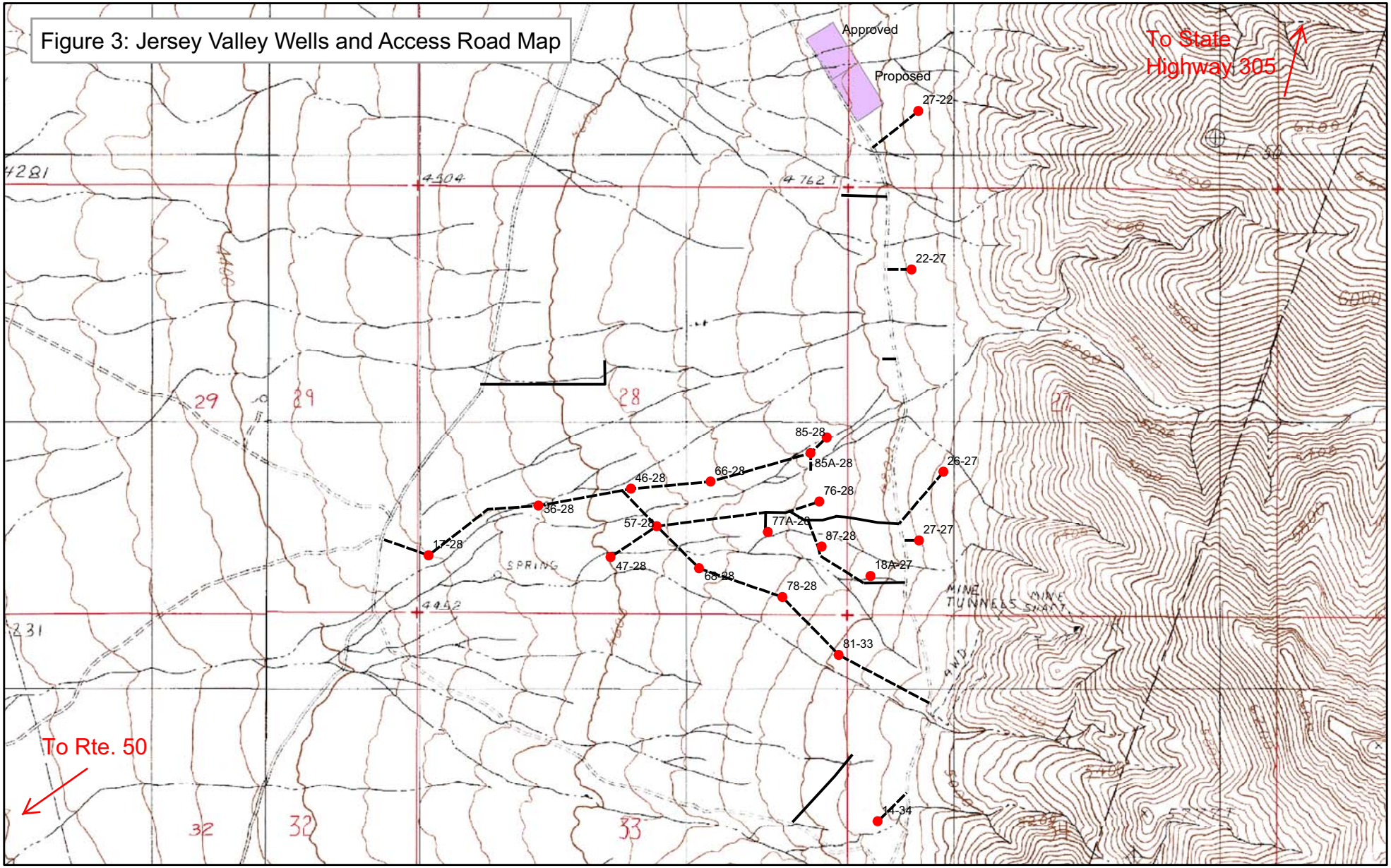
N W E S

ORMAT

Map Date: 03/17/09

0 0.5 1 2 Miles

Figure 3: Jersey Valley Wells and Access Road Map



LEGEND

- Proposed Well Location
- Existing Access
- Proposed Access
- Proposed Gravel Source
- Intermittent Stream

N W E S

0 0.25 0.5 1 Miles

ORMAT

Map Date: 11/30/09

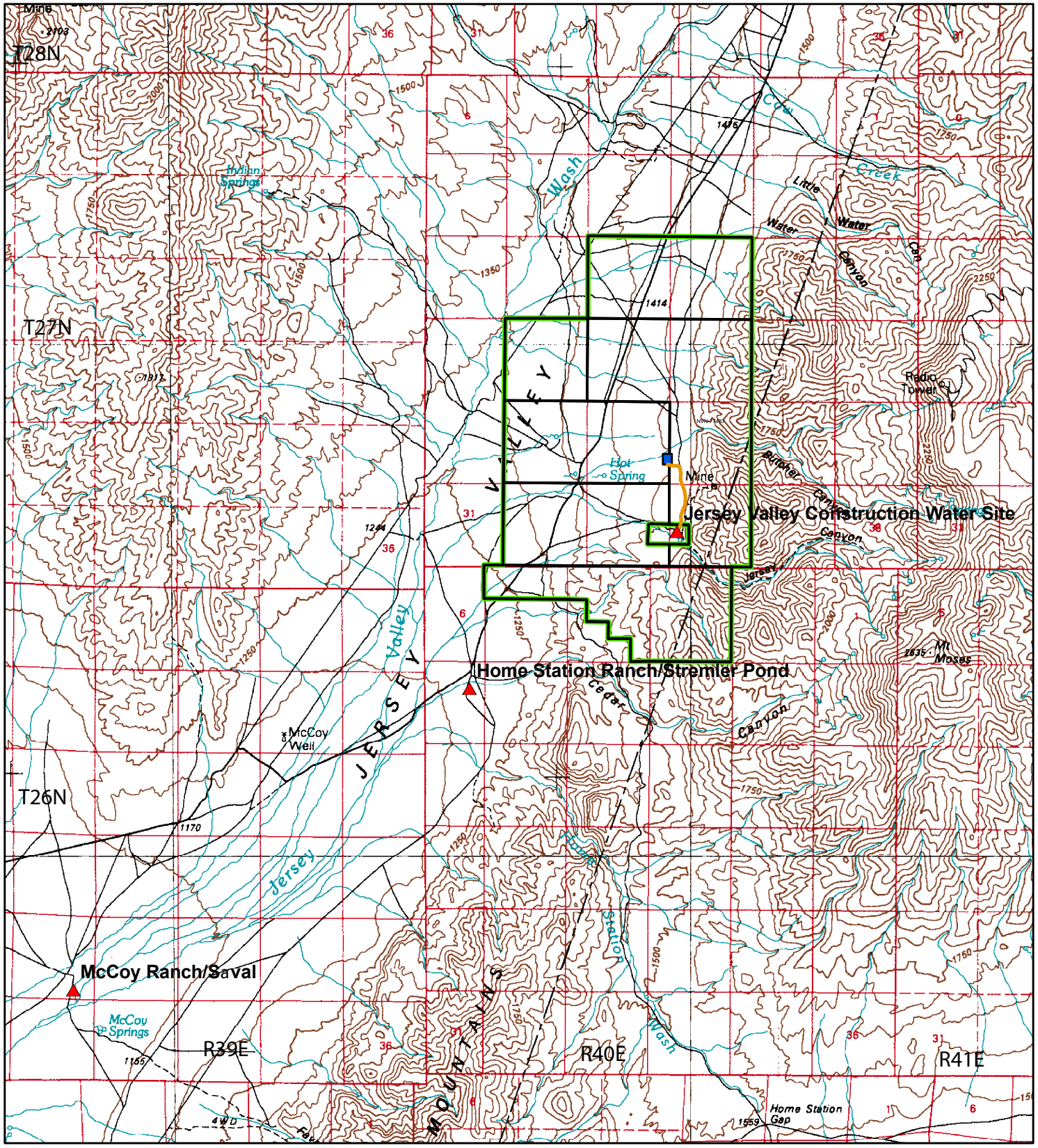


Figure 4: Jersey Valley Water Sources

LEGEND

- Possible Water Source
- Proposed Temporary Construction Water Pipeline
- Proposed Power Plant (9.2 acres)
- Jersey Valley Geothermal Lease Boundary
- Jersey Valley Geothermal Unit Area (NVN-83483X)
- Intermittent Stream

N
W E
S

0 1 2 4 Miles

ORMAT®

Map Date: 11/22/2009

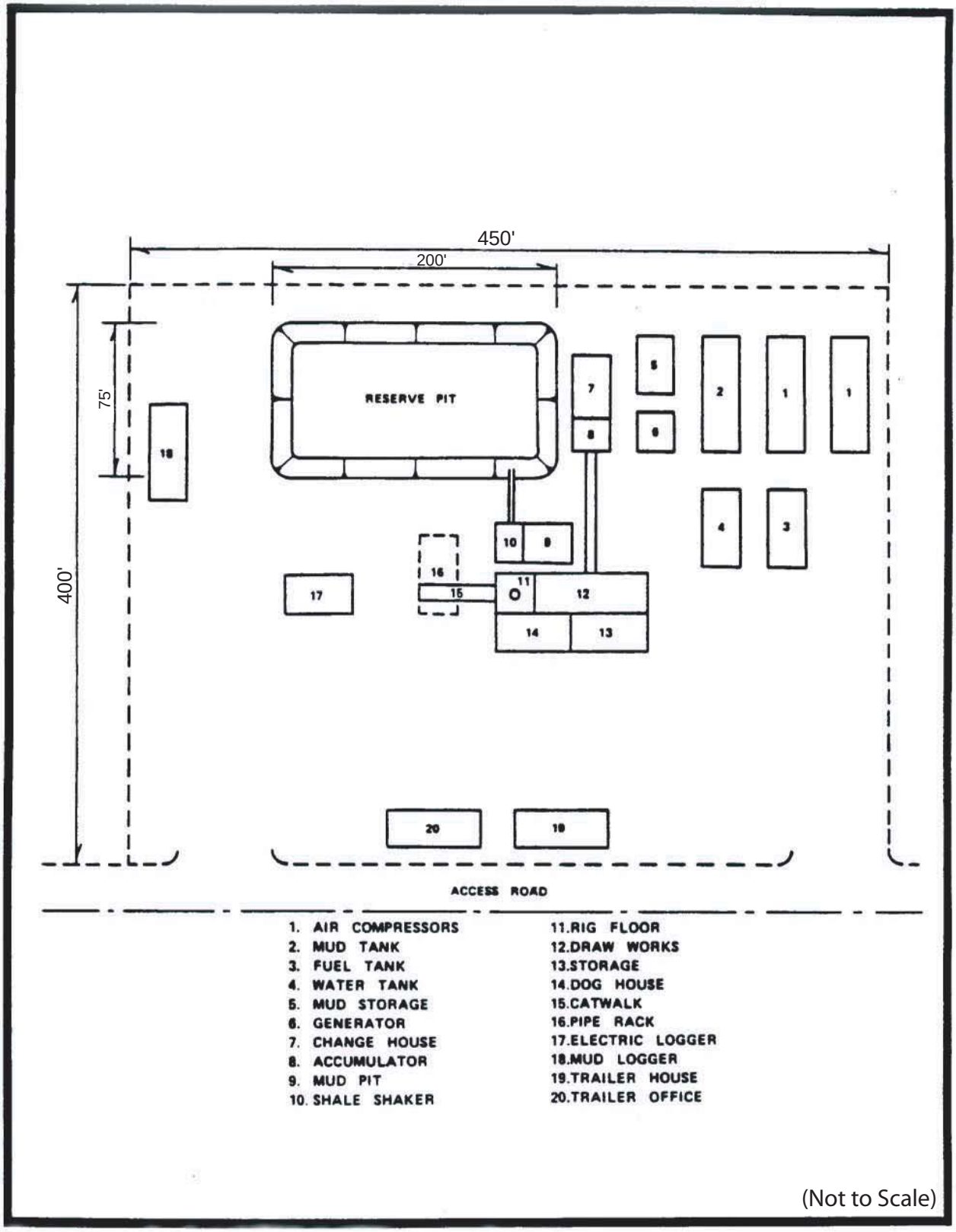
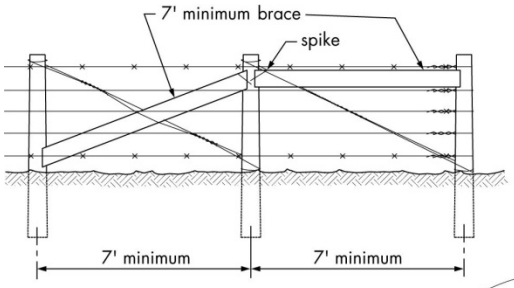
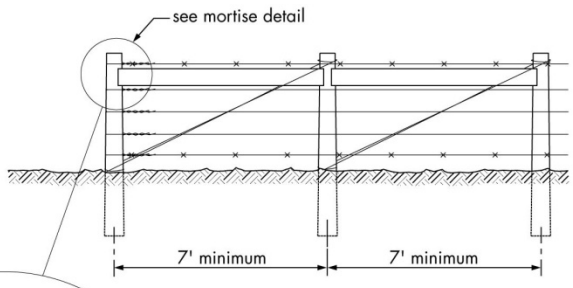


Figure 5: Typical Full-Size Well Site Layout

Figure 6: Recommended Construction Standards for Exclosure Fences in Livestock Areas



End Panel–Type 1



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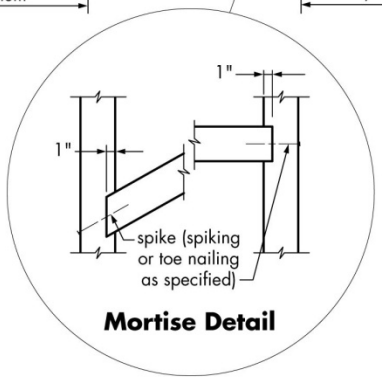
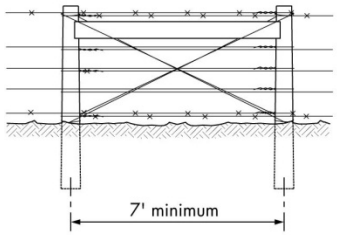
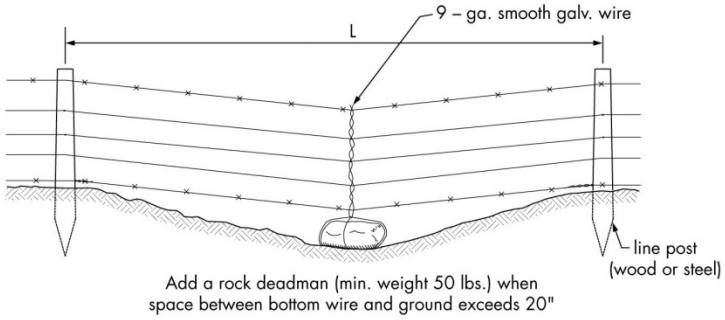


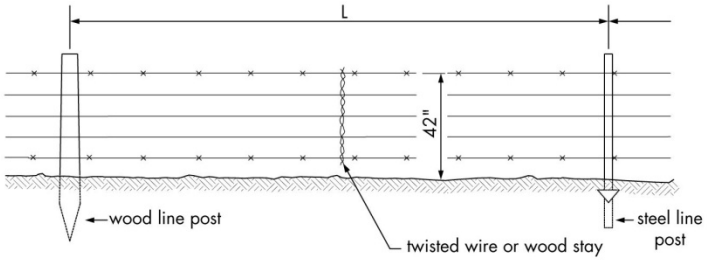
Mortise Detail



Stress Panel



Panel at Minor Depression



Line Panels

REVISED
UTILIZATION PLAN

JERSEY VALLEY
GEOTHERMAL DEVELOPMENT PROJECT

PERSHING AND LANDER COUNTIES, NEVADA

APRIL 2009
REVISED FEBRUARY 2010
REVISED MARCH 2010
REVISED APRIL 2010

Project Applicant:

ORMAT NEVADA, INC.
6225 NEIL ROAD, SUITE 300
RENO, NV 89511

ORMAT NEVADA, INC.
JERSEY VALLEY
GEOTHERMAL DEVELOPMENT PROJECT

REVISED
UTILIZATION PLAN
43 CFR 3272.11 AND 3272.12

Ormat Nevada, Inc. (Ormat) is proposing to construct, operate, and maintain the Jersey Valley Geothermal Development Project (Project). The Project would include the construction and operation of a energy generation facility, geothermal fluid production and injection well pads and wells, access roads, geothermal fluid pipelines, an electrical transmission line and ancillary support facilities. The Project is located in Lander and Pershing Counties, Nevada (see Figure 1 and Figure 2).

The Project is located within the Jersey Valley Geothermal Unit (NVN-83484X), which is comprised of federal geothermal leases NVN-74881, NVN-74883, NVN-77481, NVN-77482 and NVN-77483. The Jersey Valley unit area encompasses approximately 7,000 acres of public and private lands in Sections 15-16, 20-22, 27-29 and 32-34, Township 27 North, Range 40 East (T27N, R40E), Mount Diablo Baseline and Meridian (MDB&M), and the entirety of Section 3 and portions of Sections 4 and 5, T26N, R40E, MDB&M (see Figure 2).

The site is accessed by traveling south on State Route 305 from Battle Mountain approximately 11.5 miles to Copper Basin Road. Turn right onto Copper Basin Road and travel southwest for approximately 11 miles. Continue onto County Road 121 for approximately 12 miles. County Road 121 becomes Jersey Valley Road. Continue on Jersey Valley Road for approximately 8 miles. Turn left onto an unnamed dirt road traveling southeast and traverse for approximately 1.5 miles and proceed to the signed area on the west side of the road.

The contents of this Utilization Plan are organized as requested in 43 CFR 3272.11 and 43 CFR 3272.12, as detailed below.

§ 3272.11 How should I describe the proposed utilization facility?

Your description must include:

(a) A generalized description of all proposed structures and facilities, including their size, location, and function;

<u>Energy Plant</u>

The Jersey Valley energy plant would be an approximately 25 megawatt (MW) net rated (30 MW gross) geothermal energy plant. The proposed energy plant would be located on approximately 9-acres in the SE1/4, SE1/4 Section 28 T27N, R40E. An approximately 0.50 acre substation, used to transform generated low voltage electrical energy to the higher voltage required for a transmission line, would be constructed within the energy plant boundary (see Figure 3).

The most prominent features of the energy plant, both in height and mass, are the air-cooled condensers. They range between 28 and 35 feet in height and are about two-thirds the length of

the site. The balance of the plant is an array of pipes and a small building to house electrical equipment. The perimeter of the site is fenced with chain link to prevent unauthorized entry.

Well Field and Ancillary Facilities

The number of geothermal production and injection wells required for the Project is principally dependent on the productivity (or injectivity) of the wells and the temperature and pressure of the produced geothermal fluid. Production wells flow geothermal fluid to the surface. Injection wells are used to inject geothermal fluid from the energy plant into the geothermal reservoir. Injection ensures the longevity and renewability of the geothermal resource.

Ormat is proposing 17 production wells and 7 injection wells, all located within the Jersey Valley Unit on public lands managed by the Bureau of Land Management (BLM).

Figure 3 shows the locations of these proposed production and injection wells, and Table 1 lists the name, legal description and approximate location of each of these production and injection wells.

Table 1: Jersey Valley Production and Injection Wells

Well Name (Kettleman No.)	**Township/ Range (MDB&M)**	**Legal Description (Section Number & Aliquot Part)**	**Approximate UTM Coordinates (NAD83)**	
			Easting (m)	**Northing (m)**
Production Wells				
18A-27*	T27N, R40E	SW1/4, SW1/4 Section 27	459614	4447616
87-28	T27N, R40E	SE1/4, SE1/4 Section 28	459431	4447727
77A-28*	T27N, R40E	SE1/4, SE1/4 Section 28	459230	4447782
26-27	T27N, R40E	NW1/4, SW1/4 Section 27	459887	4448007
85-28	T27N, R40E	NE1/4, SE1/4 Section 28	459451	4448136
66-28	T27N, R40E	NW1/4, SE1/4 Section 28	459015	4447970
47-28	T27N, R40E	SE1/4, SW1/4 Section 28	458640	4447688
78-28	T27N, R40E	SE1/4, SE1/4 Section 28	459284	4447537
81-33	T27N, R40E	NE1/4, NE1/4 Section 33	459495	4447320
17-28	T27N, R40E	SW1/4, SW1/4 Section 28	457958	4447694
57-28	T27N, R40E	SW1/4, SE1/4 Section 28	458813	4447803
68-28	T27N, R40E	SW1/4, SE1/4 Section 28	458972	4447645
27-27	T27N, R40E	SW1/4, SW1/4 Section 27	459796	4447750
85A-28	T27N, R40E	NE1/4, SE1/4 Section 28	459390	4448078
46-28	T27N, R40E	NE1/4, SW1/4 Section 28	458717	4447945
36-28	T27N, R40E	NE1/4, SW1/4 Section 28	458371	4447881
76-28	T27N, R40E	NE1/4, SE1/4 Section 28	459424	4447897
Injection Wells				

Well Name (Kettleman	Township/ Range	Legal Description (Section Number & Aliquot	Approximate UTM Coordinates (NAD83)	
81-28*	T27N, R40E	NE1/4, NE1/4 Section 28	459504	4449044
14-27*	T27N, R40E	SW1/4, NW1/4 Section 27	459658	4448430
44-28*	T27N, R40E	SE1/4, NW1/4 Section 28	458618	4448425
27-22	T27N, R40E	SW1/4, SW1/4 Section 22	459794	4449360
22-27	T27N, R40E	NW1/4, NW1/4 Section 27	459768	4448766
14-34	T27N, R40E	SW1/4, NW1/4 Section 34	459641	4446697
13-34*	T27N, R40E	SW1/4, NW1/4 Section 34	459546	4446949
* Denotes wells that are currently approved.				

The production and injection well locations are tentative and may need to be adjusted as additional geologic, geophysical and geothermal reservoir information is obtained as new wells are drilled and tested.

Temporary surface disturbance for the proposed 17 production and 7 injection wells would be 98.4 acres (49.2 acres permanent disturbance).

Geothermal Fluid Pipelines

The geothermal fluid production and injection pipelines would bring the geothermal fluid from the production wells to the energy plant and deliver the cooled geothermal fluid from the energy plant to the injection wells, respectively.

Proposed production and injection pipeline routes are shown in Figure 3. Approximately 4.72 miles of production pipeline and 2.85 miles of injection pipeline are proposed.

The production and injection pipeline routes generally follow the shortest distance from each well pad to the next well pad or the energy plant in order to minimize the amount of pipe required, reduce heat losses and the energy required to move the fluids, and minimize the amount of ground disturbance. In addition, the proposed pipeline routes generally follow existing or proposed roads to facilitate ongoing monitoring and future maintenance.

However, the final alignment of the pipeline routes would be dictated by the specific wells completed for the project and the need to match fluid characteristics and balance fluid volumes in these pipelines.

(b) A generalized description of proposed facility operations, including estimated total production and injection rates; estimated well flow rates, pressures, and temperatures; facility net and gross electrical generation; and, if applicable, interconnection with other utilization facilities. If it is a direct use facility, send us the information we need to determine the amount of resource utilized;

The 25 MW net (30 MW gross) Ormat energy plant would utilize a binary design with an air-cooled heat rejection system.

The geothermal fluids for the binary energy plant would be produced from the production wells by pumping. Once delivered to the energy plant, the heat in the geothermal fluid would be transferred to the "binary" (or secondary) fluid in multiple stage non-contact heat exchangers. The binary turbine units would use pentane (C_5H_{12}), a flammable but non-toxic hydrocarbon, as the binary fluid, which circulates in a closed loop. The heat from the geothermal fluid vaporizes the binary fluid, which turns the binary turbine and electrical generator to make electricity.

The vaporized binary fluid exits the turbine and is condensed back into a liquid in a shell-and-tube, non-contact, air-cooled condenser. The condensed binary fluid is then pumped back to the heat exchangers for re-heating and vaporization, completing the closed cycle.

The residual geothermal fluid from the heat exchangers is pumped under pressure out to the geothermal injection wells through the injection pipelines and injected back into the geothermal reservoir. The geothermal fluid would flow through the binary energy plant in a closed system, with no emissions of non-condensable gases to the atmosphere.

During normal well field operations, total geothermal fluid production rates are expected to be approximately 15,150 gallons per minute (gpm) at 335°F. Individual production well flow rates are expected to be approximately 2,165 gpm with a wellhead pressure of about 220 pounds per square inch gauge (psig).

Geothermal fluid injection rates are approximately 15,150 gpm. Individual injection wells are expected to receive approximately 2,165 gpm of 170°F geothermal fluid with wellhead injection pressures of about 300 psig.

(c) A contour map of the entire utilization site, showing production and injection well pads, pipeline routes, facility locations, drainage structures, and existing and planned access and lateral roads;

Please see Figure 3.

(d) A description of site preparation and associated surface disturbance, including the source for site or road building materials, amounts of cut and fill, drainage structures, analysis of all site evaluation studies prepared for the site(s), and a description of any additional tests, studies, or surveys which are planned to assess the geologic suitability of the site(s);

As much as possible, native materials (derived from grading to balance cut and fill) would be used for site and road building materials. Approximately 92,000 yards of surfacing material may be needed for energy plant and pipeline construction (engineering calculations used to determine aggregate needs are combined with the provided civil work).

Drill pad and road building material (gravel) would be obtained from an established aggregate pit in NE1/4, SE1/4, Section 21, T27N, R40E (see Figure 3). Additionally, the existing pit would be expanded approximately 5.5 acres to the southeast (SW1/4, SW1/4 Section 22, T27N, R40E) to accommodate the Project's aggregate needs.

<u>Pipeline Construction</u>

Pipeline construction would begin by vertically auguring nominal 24-inch diameter holes into the ground about eight to ten feet deep at approximately 30-foot intervals along the pipeline route (twin holes for two supports may be drilled at the pipeline anchor points, which would be located at the center of each expansion loop and in between each expansion loop). Dirt removed from the holes would be cast on the ground adjacent to each hole. The steel pipe "sleeper" would be placed in the hole and concrete poured to fill the hole slightly above the ground surface. The steel pipe sleeper would extend above the concrete, averaging approximately one foot above ground surface.

While the concrete is curing, the approximately 30-foot long steel pipe sections would be delivered and placed along the construction corridor. A small crane would lift the pipe sections onto the pipe supports and temporary pipe jacks so that they could be welded together into a solid pipeline. Once welded and the welds tested, the pipe would be jacketed with insulation and an aluminum sheath (appropriately colored, likely covert green, to blend with the area).

When completed, the top of the new geothermal pipelines would average three feet above the ground surface. However, a number of pipeline lengths could be up to six feet in height to accommodate terrain undulations and to facilitate movement of wildlife and livestock through the wellfield.

Electrical power and instrumentation cables for the wells would then either be installed in steel conduit constructed along the same pipe sleepers or buried in a trench dug along the pipeline route. If the trenching option for the energy and control cables is selected, an approximately 12-inch wide trench would be excavated to an average depth of approximately three feet deep along side the pipeline sleepers.

The pipelines would be constructed across roads to allow continued vehicle access. This would typically use the cut-and-fill method, where a trench would be cut through the road, a prefabricated, "U"-shaped, oversized pipe sleeve (containing the fabricated geothermal fluid pipeline with the insulation and metal cladding in place) installed in the trench, the excavated dirt backfilled and compacted around and above the oversize pipe sleeve, and the roadbed material repaired or replaced. Alternatively, the pipelines could be constructed across the roads on sleepers (as described above) and the roadbed run up and over the pipeline. This would entail constructing a concrete conduit over a pipeline where it crosses a road, then compacting dirt on either side of the conduit sufficient to ramp the roadbed up and over the conduit to allow traffic to travel over the pipeline.

Energy Plant Construction

Energy plant site preparation activities would begin with clearing, earthwork, drainage and other improvements necessary for commencement of construction. Clearing would include removal of organic material, stumps, brush and slash.

A portion of the energy plant site and adjacent well pads would be devoted to equipment and materials laydown, storage, construction equipment parking, small fabrication areas, office trailers and parking. Equipment and materials laydown space is required for large turbine parts, structural steel, piping spools, electrical components, switchyard apparatus, and building parts. Mobile trailers or similar suitable facilities (e.g., modular offices) would be brought to the site to be used as construction offices for owner, contractor, and subcontractor personnel. Travel

trailers would be used for construction management to reside on the site and would provide for 24 hour management and emergency response. Parking would be provided for construction workers and visitors within the energy plant area.

Temporary utilities would be provided for the construction offices, the laydown area, and the energy plant site. Temporary construction energy would be supplied by a temporary generator and, if available when the transmission line is completed, at the site by utility-furnished power. Area lighting would be provided for safety and security. Drinking water would be imported and distributed daily. Portable toilets would be provided throughout the site, office and travel trailers and would connect to temporary septic holding systems.

Consistent with safety requirements, energy plant buildings, structures, pipe, etc. would each be painted an appropriate color (likely covert green) to blend with the area and minimize visibility.

Access Road Construction

New access roads with a 15-foot wide road bed would be constructed using a dozer and/or road grader. A typical plan view of an access road is shown on sheet C-1, Civil Site Plan and typical cross sectional views are shown on sheet C-2, Profiles and Details. New access roads would be required for the energy plant and pipelines as follows (see Figure 3):

- About 1,770 feet of new road would be constructed to 66-28 (from the existing road to the northwest);
- About 870 feet of new road would be constructed to 13-34 (from the existing road);
- About 670 feet of new road would be constructed to between 78-28 and 87-28; and
- About 725 feet of new road would be constructed to the energy plant (from the existing road).

The total estimated area of surface disturbance required for new access road construction, assuming a 20-foot wide area of disturbance would be about 1.85 acres.

Constructed access roads crossing existing drainages may require installation of culverts. Culvert installation would follow BLM design criteria and would be constructed pursuant to standards established in the Gold Book (Fourth Edition - Revised 2007).

(e) The source, quality, and proposed consumption rate of water used during facility operations, and the source and quantity of water used during facility construction;

Water required for construction activities would be obtained from established private ranch sources Home Station Ranch (NW1/4 Section 7, T26N, R40E) and McCoy Ranch (SE1/4 Section 29, T26N, R39E) and trucked onsite. Additional water may be obtained from a well owned by the Saval Ranch Company on private lands within the Jersey Valley unit (NW/14, SW1/4 Section 34, T27N R40E) and piped to the energy plant site. The temporary construction water pipeline would be laid on the side of the existing roads and no additional surface disturbance is anticipated.

Approximately 5,000 gallons per day (5.60 acre-feet per year) would be consumed during construction of the energy plant.

Up to approximately 325 gallons of water will be consumed per day for the facility operations (0.37 acre-feet per year). This water will be obtained from the established private ranch sources identified above (see Figure 4). This water, used for septic purposes, will be trucked to the power plant and stored onsite. Drinking water will be purchased form a commercial bottled water source.

Water quality information would be known prior to its usage.

(f) The methods for meeting air quality standards during facility construction and operation, especially standards concerning noncondensible gases;

There would be no non-condensable gas emissions during normal operations. However, some of the binary working fluid would be released to the atmosphere from rotating seals and flanges. Also during normal operations, a small quantity of air enters the pentane loop in the air-cooled condenser. This air leaked into the pentane loop is discharged back to the atmosphere through a stack, along with a small quantity of pentane. During major maintenance activities on the pentane side of the binary power plant units, the liquid pentane would first be transferred to the pentane storage tank. However, not all of the pentane can be removed in this manner, and the residual pentane would be discharged to the atmosphere when the binary power plant unit is opened. All of these releases, estimated to average about 12 tons per year, are regulated through a permit issued by BAPC to ensure that these emissions do not result in ambient concentrations of ozone (which can be created from the reaction of ambient concentrations of hydrocarbons and NO_x) in excess of the applicable Ambient Air Quality Standards.

Ormat would continue to maintain its Surface Area Disturbance (SAD) permit with the NDEP-BAPC, and continue to implement the required actions to minimize fugitive dust emissions, during the well drilling and construction phases of the project. Once the plant is operational, the SAD regulation would continue as a part of the Project NDEP-BAPC Air Quality Operating permit.

(g) An estimated number of personnel needed during construction and operation of the facility;

Project construction would likely require a maximum of up to 50 workers, with an average of 20 workers after grading and excavation. Once operating, the Project would have approximately 20 employees. The power plants would be staffed and approximately 5 employees may be onsite at a given time. All workers/employees are expected to live in Battle Mountain.

(h) A construction schedule;

Construction of the energy plant and well field facilities would take approximately 1 year once all permits are obtained and equipment orders are scheduled.

(i) A schedule for testing of the facility and/or well equipment, and for the start of commercial operations;

Flow, temperature and pressure would be continuously monitored. Well integrity would be tested every five years. Commercial operations are anticipated to commence at the end of the last quarter of 2010.

(j) A description of architectural landscaping or other measures to minimize visual impacts; and

The energy plant, pipelines, wellheads, pump motors and motor control buildings would each be painted an appropriate color (likely covert green) to blend with the area and minimize visibility. The fence constructed around each of the production well sites would also be painted an appropriate color (likely covert green) to blend with the area.

(k) Any additional information or data which we may require.

Ormat would provide appropriate additional information upon request.

§ 3272.12 How do I describe the environmental protection measures I intend to take?

(a) Describe, at a minimum, your proposed measures to:

(1) Prevent or control fires;

All construction and operating equipment would be equipped with applicable exhaust spark arresters. Fire extinguishers would be available on the site. Water that is used for construction and dust control would be available for fire fighting. Personnel would be allowed to smoke only in designated areas, and they would be required to follow applicable BLM regulations regarding smoking. The following fire contingency plan is provided below:

Fire Contingency Plan

1. Any small fires which occur around the well pad during drilling and/or testing operations should be able to be controlled by rig personnel utilizing on-site firefighting equipment.

2. The BLM Battle Mountain District Office (775.635.4000) would be notified of any wildland fire, even if the available personnel can handle the situation or the fire poses no threat to the surrounding area. Additionally, the Central Nevada Interagency Dispatch (CNIDC) would be notified (775.623.1555 during business hours, 775.623.3444 after business hours).

3. A roster of emergency phone numbers would be available onsite so that the appropriate firefighting agency can be contacted in case of a fire.

4. All vehicles shall carry at a minimum a shovel and five gallons of water (preferably in a backpack pump), in addition to a conventional fire extinguisher.

5. Adequate fire fighting equipment (a shovel, a pulaski, standard fire extinguisher(s), and an ample water supply) shall be kept readily available at each active drill site.

6. Vehicle catalytic converters (on vehicles that would enter and leave the drill site on a regular basis) shall be inspected often and cleaned of all flammable debris.

7. All cutting/welding torch use, electric-arc welding, and grinding operations shall be conducted in an area free, or mostly free, from vegetation. An ample water supply and shovel shall be on hand to extinguish any fires created from sparks. At least one person in addition to the cutter/welder/grinder shall be at the work site to promptly detect fires created by sparks.

8. Personnel would be responsible for being aware of and complying with the requirements of any fire restrictions or closures issued by the BLM Battle Mountain District Office, as publicized in the local media or posted at various sites throughout the field office district.

(2) Prevent soil erosion;

BLM best management practices for storm water would be followed, as applicable, on public lands as described below.

Cut and fill activities would be minimized through the selection of the energy plant site and pipeline routes. Off-site storm water would be intercepted in ditches and channeled to energy dissipaters as necessary to minimize erosion around the energy plant. To minimize erosion from storm water runoff, access roads would be maintained consistent with the best management practices to development roads.

(3) Protect surface or ground water;

Geothermal fluids would not be discharged to the ground under normal operating conditions. Accidental discharges of geothermal fluids are unlikely because of frequent inspections, ultrasonic testing of the pipeline, flow and pressure monitoring and well pump and pipeline valve shutdown features. Further, geothermal wells are cased to prevent co-mingling of the geothermal fluids with underground aquifers.

(4) Protect fish and wildlife;

There is no known fish habitat within the proposed project area.

Many disturbed areas can begin to be reclaimed almost immediately after construction is completed. Erosion control measures after construction would include revegetation and periodic maintenance. Disturbed areas that would not be used after construction would be revegetated with the proper seed mixture and planting procedures prescribed by the BLM. Any topsoils enriched in organic material may be stockpiled on previously disturbed areas and applied to enhance areas to be reclaimed by revegetation. Periodic maintenance of the energy plant site would be conducted as needed to minimize continual erosion.

To prevent undue degradation and removal of habitat, cover and food, existing roads would be used whenever possible and cross country travel would be restricted to designated construction areas. Furthermore, the energy plant site would be fenced to prevent wildlife from entering.

Additionally, once the well is drilled and well head completed, an industrial grate is placed over the hole to prevent humans and wildlife from falling into the cellar.

(5) Protect cultural, visual, and other natural resources;

Cultural resource surveys have been conducted. Any areas which contain NRHP-eligible and unevaluated cultural resource sites would be avoided. Ormat employees, contractors, and suppliers would be reminded that all cultural resources are protected and if found or discovered shall be left in place and reported to the Ormat representative and/or their supervisor.

Please see section 3272.11(j) above for a discussion of measures to reduce visual impacts.

(6) Minimize air and noise pollution; and

Ormat would comply with any air quality requirements prescribed by the NDEP-BAPC. Compaction of the energy plant site and any potential new well pads during construction, and gravel placed on the access roads would alleviate a large portion of the fugitive dust emissions. In addition, watering the ground would be used to reduce dust emissions during construction. State of the art equipment and design would be used to ensure minimal emissions of pentane. The energy plant would not have any air emissions during normal operation.

To abate noise pollution, mufflers would be used on all drilling rig engines. Construction and drilling noise would be minimized through operational practices, which would avoid or minimize practices that typically generate high noise levels or distinctive noise impacts.

(7) Minimize hazards to public health and safety during normal operations.

Construction and operation activities would be conducted in a manner to avoid creating any hazards to public health and safety. The project is remotely located and would not likely cause hazards to public health and safety. A power plant operations and maintenance manual would be developed in parallel with site construction. This manual would be available onsite once the plant commences operations.

Additionally, a spill or discharge contingency plan is provided below:

<u>Spill or Discharge Contingency Plan</u>

1. Potential Sources of Accidental Spills or Discharges
   a. Geothermal Fluid
      Accidental geothermal fluid spills or discharges are very unlikely because the hole would be cased and blowout prevention equipment would be utilized. However, accidental discharges or spills could result from any of the following:
      (1) Loss of well control (blowout);
      (2) Pipeline leak or rupture;
      (3) Leakage from test tank

   b. Drilling Muds
      Muds are a mixture of water, non-toxic chemicals and solid particles used in the drilling operations to lubricate and cool the bit in the hole, to carry cuttings out of the hole, to maintain the hole condition and to control formation pressure. Drilling muds are prepared and stored in metal tanks at the drilling site. Waste drilling mud and cuttings are discharged into the reserve pit, which is open and is

adequately sized to hold the volume necessary for the operation. Accidental discharges of drilling mud are unlikely, but could occur by:
(1) overflow of the reserve pit;
(2) reserve pit wall seepage or wall failure;
(3) discharge from equipment failure on location; or
(4) shallow lost circulation channeling to the surface.

c. Lubricating or Fuel Oils and Petroleum Products
A discharge of this type would probably be very small and be from equipment used in the field. To minimize the potential for spills, all petroleum products on site are labeled, stored and handled in conformance with applicable federal and state requirements. All materials except diesel fuel are stored in the original shipping containers. Diesel fuel is stored in on-board tanks on the drill rig and replenished from a bulk tank truck using an electric transfer pump and hard lines. Supervisors trained in spill prevention, containment and clean-up are on-site 24 hours a day. Potential locations for accidental spills are:
(1) drilling equipment and machinery at and around the drilling location;
(2) other miscellaneous equipment and machinery at well site and roads;
(3) storage areas; and
(4) equipment servicing areas.

d. Construction/Maintenance Debris
Trash shall be contained on-site and hauled to an approved landfill. Burial of trash on-site shall not be permitted.

2. Plan for Cleanup and Abatement
In the event of discharge of formation fluids, drilling muds or petroleum products, the person responsible for the operation would make an immediate investigation, then contact the Drilling Supervisor and advise him of the spill. The Drilling Supervisor would in turn call out equipment, regulate field operations, or do other work as applicable for control and clean up of the spill, as follows:

a. Action - Small, Containable Spill
If the spill is small (i.e., less than 25 gallons) and easily containable without endangering the watershed, the Drilling Supervisor would direct and supervise complete cleanup and return to normal operations.

b. Action - Large or Uncontainable Spill
If the spill is larger than 25 gallons, or is not easily contained, or endangers, or has entered, the watershed, the Drilling Supervisor would proceed to take necessary action to curtail, contain and cleanup the spill, as above, and notify personnel as listed below.

c. Notification
(1) The Drilling Supervisor would, as quickly as practicable:
- Call out contractor(s), as required.
- Notify the Ormat Project Manager.
- Notify the local and state law enforcement agencies if the public safety is threatened.

(2) The Ormat Project Manager would notify the following as soon as practical and work closely with them in all phases of the curtailment, containment and cleanup operations:

Division of Minerals
State of Nevada
400 W. King
Carson City, NV 89703
775.684.7040

NDEP
Division of Emergency Management
901 S. Stewart Street
Carson City, NV 89706
775.688.2830 or 888.331.6337

BLM, Battle Mountain District Office
(within 24 hours of the knowledge of a reportable release)
50 Bastian Road
Battle Mountain, Nevada 89820
775.635.4000

National Response Center
800.424.8802

The Drilling Supervisor would also advise local population and affected property owners if spill affects residents or property.

d. Specific Procedures

(1) For geothermal fluid spills:

- Contain spillage with dikes if possible and haul to disposal site by vacuum or water trucks or dispose of in a manner acceptable to the Division of Minerals and Bureau of Land Management.

(2) For drilling mud:

- Repair reserve pit or contain with dikes. Haul liquid to another reserve pit, available tanks or approved disposal site.

(3) For petroleum products:

- Contain spill with available manpower. Use absorbents and dispose of same in approved disposal area.
- Spills of petroleum products in excess of 25 gallons must be reported to the Nevada Division of Environmental Protection as soon as possible, but no later than the end of the first working day of the release at:
    - In-state: 888-331-6337
    - Out of state: 775-687-9485

For (1) through (3) above, Ormat would have the source of spill repaired at the earliest practical time, and continue working crews and equipment on cleanup until all concerned agencies are satisfied.

e. Confirm telephone notification to agencies and regulatory bodies. Telephone notification shall be confirmed by the Ormat Project Manager in writing within two weeks of telephone notification.

Written confirmation would contain:
(1) Reason for the discharge or spillage.
(2) Duration and volume of discharge or spillage.
(3) Steps taken to correct problem.
(4) Steps taken to prevent recurrence of problem.

(b) If we require, you must also describe how you would monitor your facility operations to ensure they comply with the requirements of 43 CFR 3200.4, and noise, air, and water quality standards at all times. We will consult with another involved surface management

agency regarding monitoring requirements. You must also include provisions for monitoring other environmental parameters we may require.

Ormat would provide compliance measures upon request.

(c) Based on what level of impacts your operations may cause, we may require you to collect data concerning existing air and water quality, noise, seismicity, subsidence, ecological systems, or other environmental information for up to one year before you begin operating. We must approve your data collection methodologies, and will consult with any other surface managing agency involved.

Ormat would collect and provide appropriate, additional environmental data if required.

(d) You must also describe how you will abandon utilization facilities and restore the site, to comply with the requirements of 43 CFR 3200.4.

The estimated life of the Project is 50 years.

Once drilling is complete, approximately half of the drill pad area can be reclaimed, but the remaining half must be kept clear for ongoing operations and the potential need to work on or re-drill the well. The portions of the cleared well sites not needed for operational and safety purposes would be recontoured to a final or intermediate contour that would blend with the surrounding topography as much as possible. Areas able to be reclaimed will be ripped, tilled, or disked on contour, as necessary and reseeded with native grasses and forbs. The stockpiled topsoils will also be spread on the area to aid in revegetation.

At the end of Project operations the wells would be plugged and abandoned as required by Nevada Division of Water Resources (NDWR) regulations. Abandonment typically involves filling the well bore with clean, heavy abandonment mud and cement until the top of the cement is at ground level, which is designed to ensure that fluids would not move across these barriers into different aquifers. The well head (and any other equipment) would then be removed, the casing cut off well below ground surface and the hole backfilled to the surface.

Reclamation of the roads would include recontouring the road back to the original contour, seeding, controlling noxious weeds and may include other techniques to improve reclamation success, such as ripping, scarifying, replacing topsoil, pitting and mulching.

Pipeline reclamation would include placing fill in the trench, compacting the fill, regarding cut-and-fill slopes to restore the original contour, replacing topsoil and revegetating in accordance with a reclamation plan.

All other above-ground facilities and areas of surface disturbance associated with geothermal development would be removed and reclaimed.

Ultimately, Ormat would prepare for NDWR approval, and then implement, a site reclamation plan. The plan would address restoring the surface grades, surface drainage and revegetation of cleared areas. largely as described above. Stormwater diversion would remain in place until successful revegetation is attained.

(e) Finally, submit any additional information or data which we may require.

Ormat would provide appropriate additional information upon request.

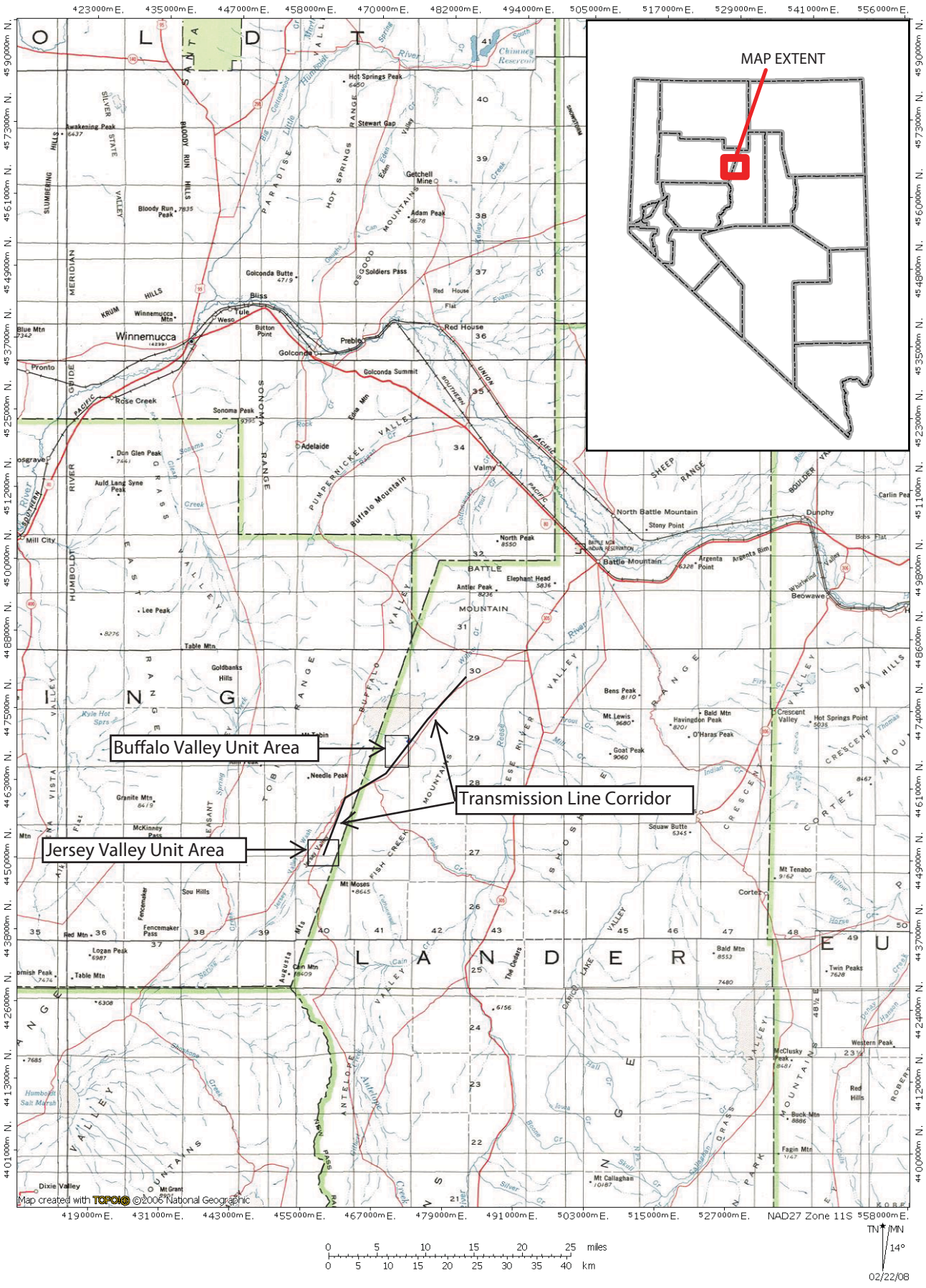
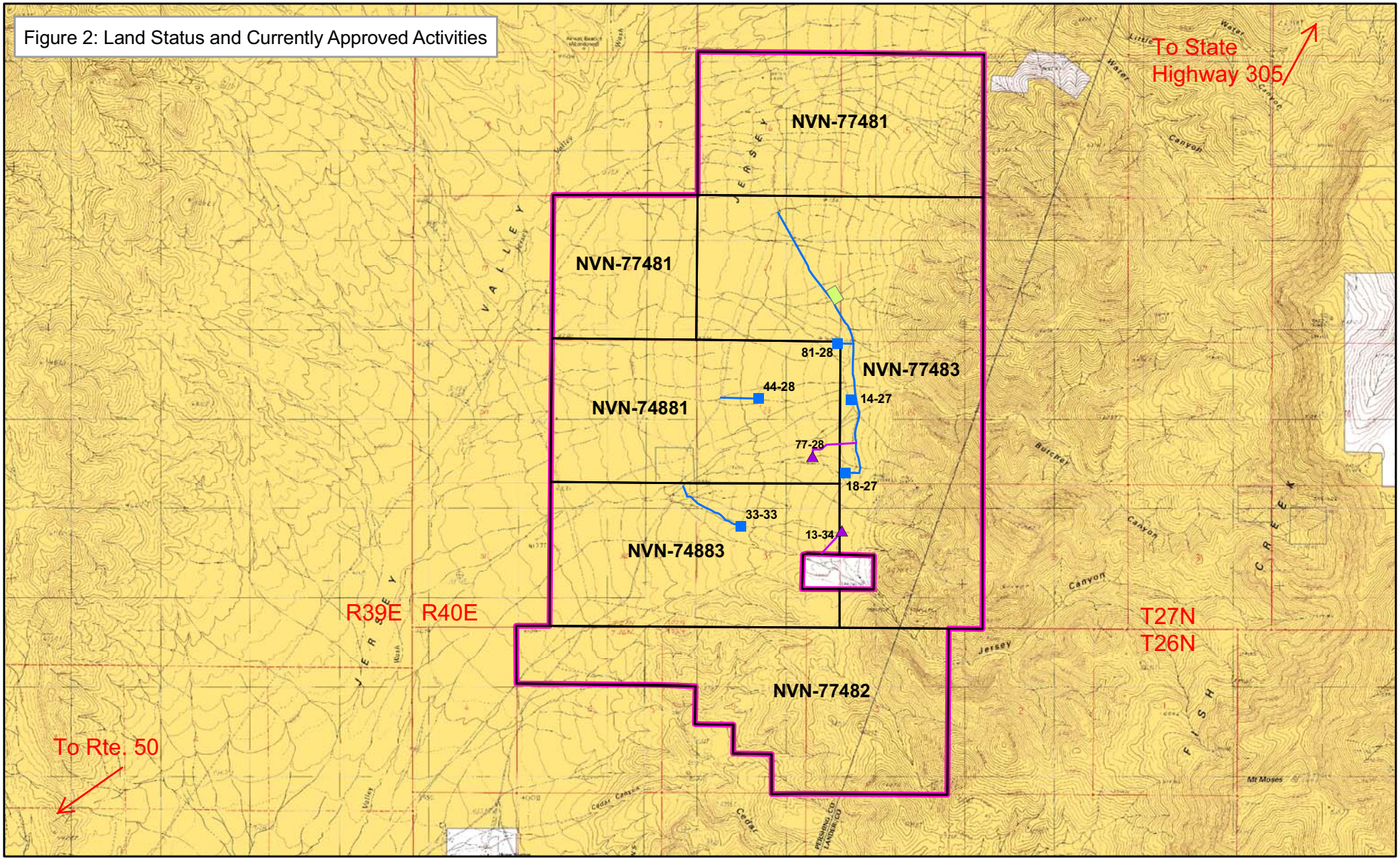


Figure 1: Project Vicinity Map

Figure 2: Land Status and Currently Approved Activities



LEGEND

- Previously Approved Well Site (2007)
- Previously Approved Well Site (2008)
- Previously Approved Access Road (2007)
- Previously Approved Access Road (2008)
- Approved Gravel Source
- Geothermal Lease Boundary
- Jersey Valley Geothermal Unit Area (NVN-83483X)
- Bureau of Land Management Land
- Private Land

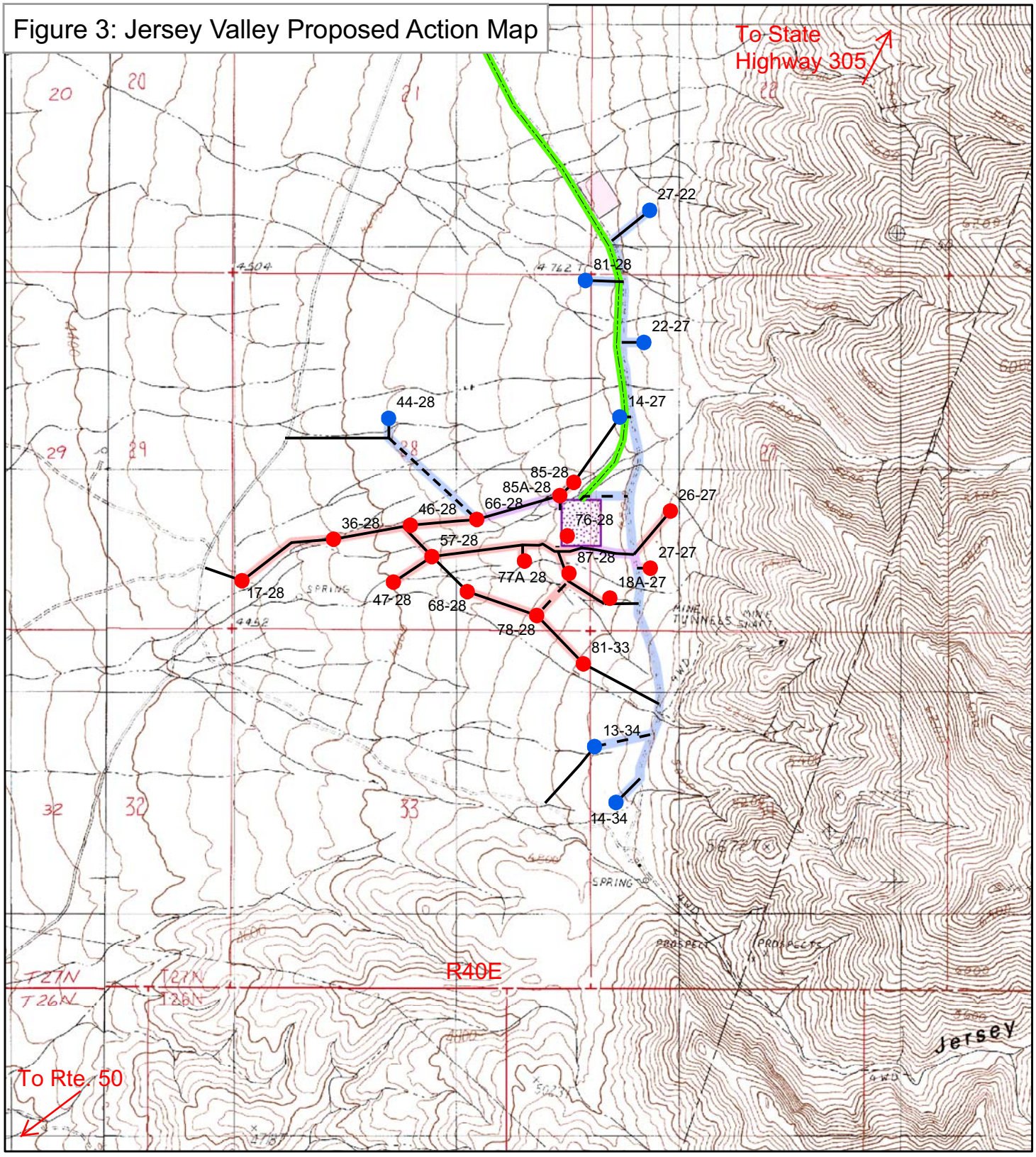
N W E S

ORMAT

Map Date: 03/17/09

0 0.5 1 2 Miles

Figure 3: Jersey Valley Proposed Action Map



LEGEND

- Injection Pipeline
- Production Pipeline
- Injection and Production Pipelines
- Proposed Gravel Source
- Intermittent Stream
- Injection Well
- Production Well
- Existing Access
- Proposed Access
- 120 kV Power ROW - Proposed Action
- Power Plant Location

N W E S

0 0.3 0.6 1.2 Miles

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Map Date: 11/23/09

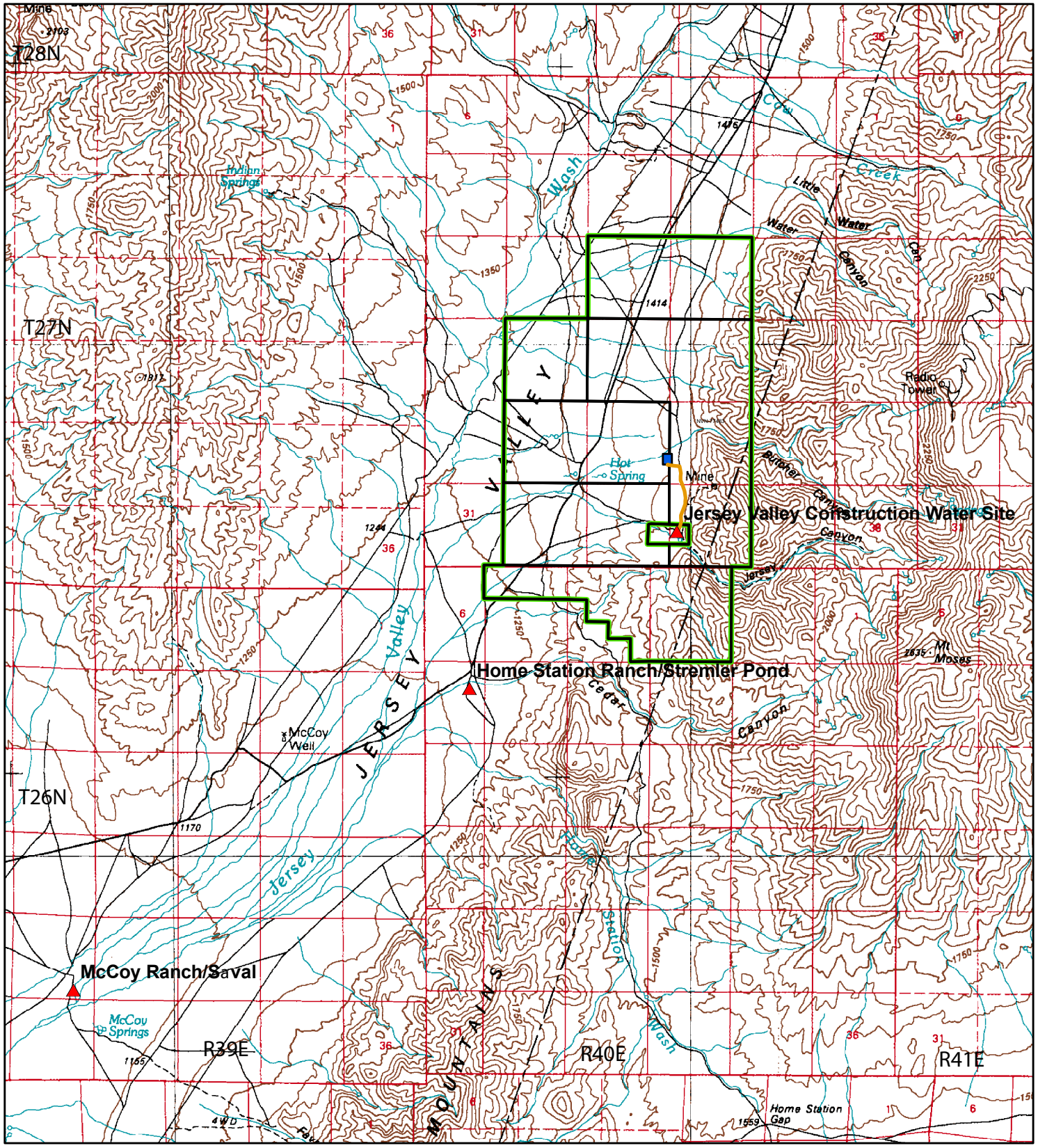

Figure 4: Jersey Valley Water Sources

LEGEND

- Possible Water Source
- Proposed Temporary Construction Water Pipeline
- Proposed Power Plant (9.2 acres)
- Jersey Valley Geothermal Lease Boundary
- Jersey Valley Geothermal Unit Area (NVN-83483X)
- Intermittent Stream

N
W E
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0 1 2 4 Miles

ORMAT®

Map Date: 11/22/2009